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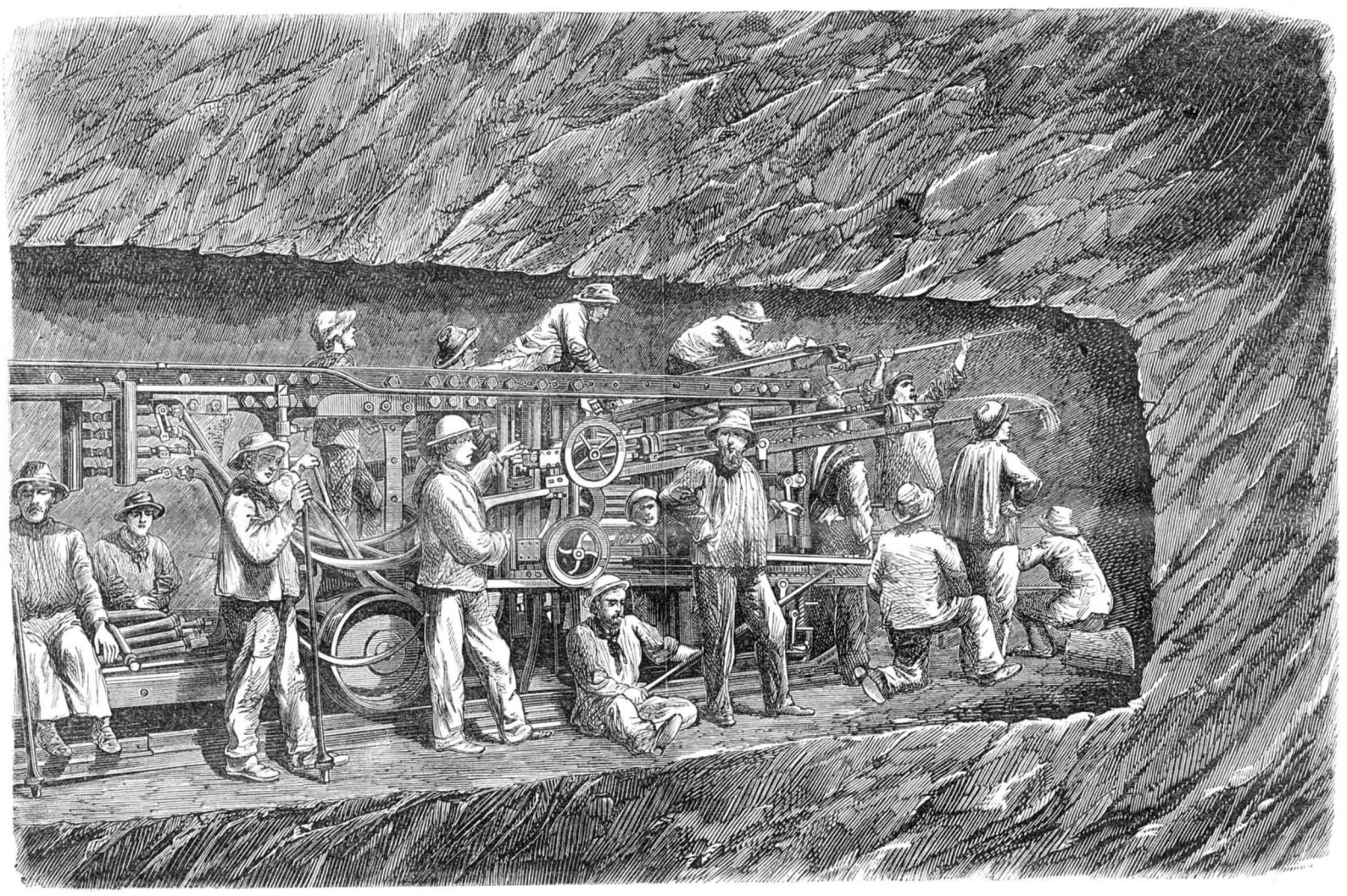
The Mont Cenis Tunnel.

WE present to our readers with this issue of the SCIENTIFIC AMERICAN an engraving representing a drift in the great Mont Cenis tunnel, with the drilling machine used. From *Engineering* and other exchanges we compile an account of this great work.

With the single exception of the Suez Canal, the Mont Cenis tunnel may probably be considered to be the grandest engineering work at present in progress, and it is, moreover, undoubtedly the boldest work of its kind which has ever been carried out, either in ancient or modern times. By its completion the railways of France will be united to those of Italy, and a continuous railway communication, without break of gage, will be established between Calais and Brindisi, a distance of 1,390 miles. Considering the growing importance of the latter port as a point of departure for the Eastern mail steamers, the value of such a system of unbroken communication can scarcely be overrated. At present the Mont Cenis Railway forms the connecting link between the French and Italian lines; but this, although affording far better accommodation than the old diligences, is still open to the objection of causing a break of gage with all its attendant evils, and, moreover, the time occupied in crossing the Alps by the summit line is far greater than that which will be taken up by traversing the tunnel when the latter is completed.

It is now sixteen years since, in 1852, the Chevalier Maus proposed to construct the Mont Cenis tunnel by means of a machine of his invention, which he estimated as capable of boring a mile and a half per annum. It is almost needless to say that such expectations were never realized, and the whole scheme was abandoned until the autumn of 1857, when a commencement was made with the present works.

The Mont Cenis tunnel, although commonly supposed to traverse Mont Cenis, does not really do so, but passes some distance to the west of that summit, the highest point of the mountain chain directly over the line of the tunnel being about 9,700 feet, above the level of the sea, while Mont Cenis, rises to upwards of 11,400 feet above that level. The tunnel is being constructed in a straight line from Forneaux, a village in the valley of the Arc, about 1½ miles from Modane, on the French side, to Bardonnèche on the Italian side of the mountain, the total distance to be traversed being 12,200 metres, or about 7 miles 1,020 yards. At Bardonnèche the nature of the ground did not allow of the tunnel being conveniently commenced at a less elevation than 1,335.38 metres, or 4,381 feet above the sea level, while at Forneaux the entrance has been made at a point 1,202.82 metres, or 3,946 feet above the same datum. The difference of level at the two ends of the tunnel is thus 132.56 metres, or 435 feet, and this difference of level alone would have necessitated a gradient of about 1 in 92 throughout its length. It having been expected, however, that during the execution of the work a considerable quantity of water would be met with, it was deemed advisable to construct the tunnel with a rising gradient of 1 in 2,000 from the Bardonnèche end, this gradient being met near the middle of the length of the tunnel by a gradient of 22·2 per 1,000, or about 1 in 45, rising from Fourneaux. The fall of 1 in 2,000 towards the Italian entrance was, of course intended to give good, drainage to the works in the event of a large influx of water taking place; but hitherto no such event has occurred, nor from the experience already gained of the nature of the material passed through, does it appear likely that it will occur, and the tunnel might, therefore, have been as readily constructed with an uniform gradient throughout, falling from the southern to the northern side. This, however, could not have been foreseen when the works were commenced, and the adoption of a falling gradient towards the southern end may even yet prove to be a useful precaution.



MACHINES AND METHODS OF BORING THE MONT CENIS TUNNEL.

The materials to be traversed by the tunnel are schist, quartz, and compact limestone, and hitherto the points at which the various strata have been found to commence and terminate have agreed very closely with the positions assigned to them by the geological surveyors. Commencing from the French end, the schist was found to extend for a distance of 2,346 yards, and this was bored through at the average rate of 1.26 metres, or rather more than 4 feet per day, a small portion of this length having been excavated by hand labor alone. Next to the schist came 550 yards of quartz which was traversed at the rate of scarcely 2 feet per day; and this was followed by the compact limestone in which the work on the French side is now being carried on at the rate during the month of April last of 2,08 metres, or about 6 feet 10 inches per day—a rate far greater than was at first anticipated. It is expected that the limestone will extend for a thickness of 3,008 yards, and that between the point where it terminates and Bardonnèche nothing but schist will be met with. So far the workings from the Italian end have been made in schist only, and during the month of April last they were carried on at the rate of 1.55 metres, or a little over 5 feet per day.

At Forneaux the compressed air is led through lines of cast-iron pipes from the buildings containing the air compressing machinery to the engineering workshops, and thence to the tunnel itself. The workshops are situated on the hill side above the level of the air-compressing machinery, but considerably below that of the mouth of the tunnel. They are fitted with a good plant of ordinary engineer's tools, most of them made by English makers, and in the smiths' shops there is a 12-cwt. hammer, which is worked by compressed air. The machinery in the workshops is ordinarily driven by a turbine, which is sunk 9 metres, or 28 feet 8 inches below the floor of the machine shop; but in winter, when the supply of the water for the turbine is stopped by the frosts, the shafting is driven by an engine worked by the compressed air. The torrent of the Arc, from which the water power for working the air-compressing machinery is obtained, is, we may mention here, never frozen even in the most severe seasons.

The general appearance of the machines will be seen from the perspective view. The frame of each machine is formed by a pair of bars about 6 feet 6 inches long, these bars having placed between them the 3 inch cylinder by the piston of which the boring tool is actuated. The cylinder is not fixed to the frame bars, but is capable of sliding on them, motion being given to it by a large worm at its hind end which gears into racks formed on the inner sides of the frame bars. The cylinder is 3 inches in diameter, and its piston has a rod about 2 inches in diameter, there being thus but a comparatively small annular area on the front of the piston on which the air continually presses. At the hind end of the frame bars of the machine is placed a kind of miniature horizontal engine worked by the compressed air; this engine driving, through a bevel gear, a square shaft which extends nearly the whole length of the machine above the boring cylinder. This shaft carries a cam which gives the necessary motion to the slide valve which governs the admission of the air to, and its release from the boring cylinder; and from the same shaft the intermittent rotary motion is given to the tool, and also the necessary advance as the hole is bored. The manner in which the advance of the tool, or rather of the cylinder, is regulated, is as follows: The cylinder is free to slide longitudinally on the frame bars, these bars having on their inner sides racks into which a worm, carried on a spindle projecting from the hind end of the cylinder, gears. On this same spindle there is a clutch, which is driven by gearing connected to the square shaft already mentioned, and when this clutch is in gear with the worm, the cylinder is advanced along the frame towards the face of the rock. As, however, the rock is of unequal hardness, the rate of advance is made dependent upon the rate at which the borer penetrates, in the following manner: The clutch by which the worm is driven is embraced by a fork formed on a bar which extends forward past the boring cylinder, and which has at

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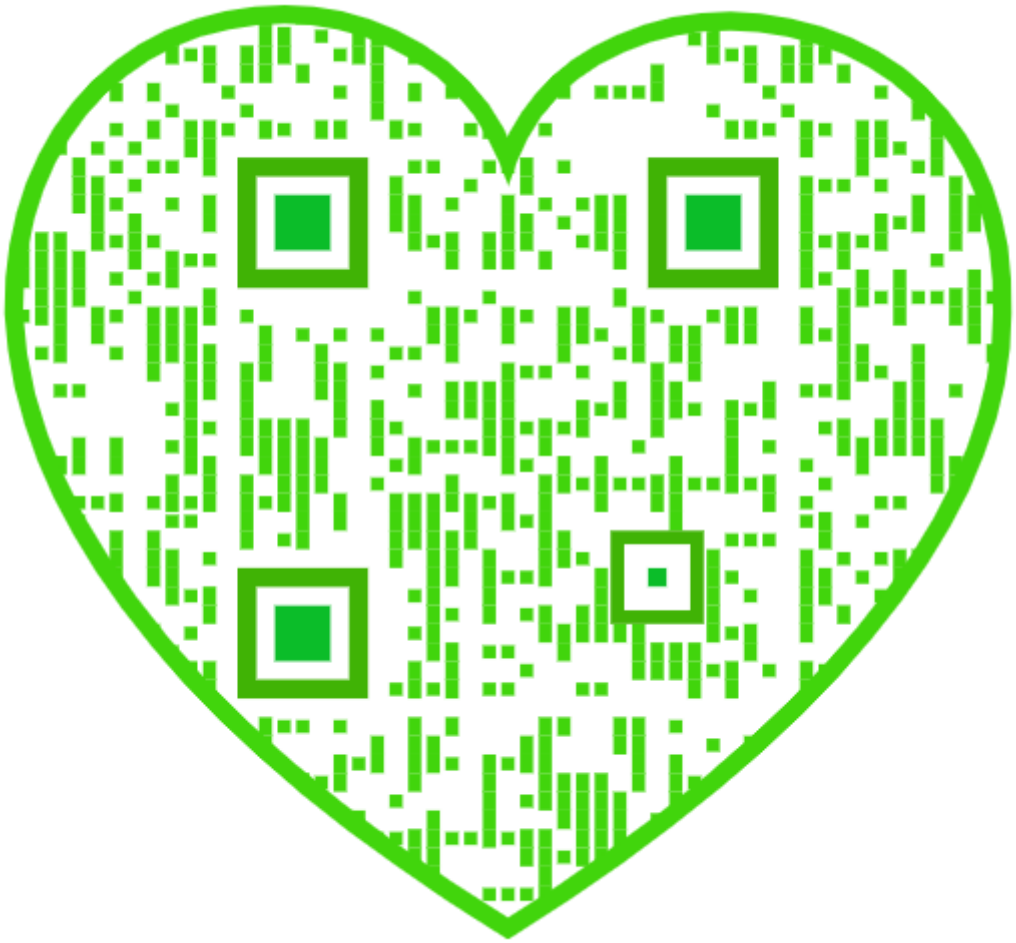

its front end a finger, which is bent so as to catch on ratchet teeth formed on the tops of the frame bars, as shown in our engraving last week. Supposing the clutch to be in gear with the worm, and the machine to be at work, the cylinder will be gradually advanced along the frame bars; but the clutch being held by the bar just mentioned, and the front end of this bar abutting against one of the ratchet teeth, cannot follow the cylinder, and consequently after the worm has made a couple of turns or so, the clutch is worked out of gear and the cylinder becomes stationary. As the boring goes on, however, the piston makes a longer and longer stroke out of the cylinder, and eventually a projection on its end raises the front end of the finger bar out of gear with the ratchet tooth, against which it abuts. As soon as this takes place a spring behind the clutch forces the latter forward into gear with the worm, and the advance of the cylinder again goes on until, the end of the finger bar coming against the next tooth, the forward motion of the clutch is again arrested until it gradually works itself out of gear. Each boring machine weighs about 6 cwt., and as the wear and tear to which they are exposed is very severe, it is found necessary to keep from three to four machines in reserve for each one at work.

The boring bars employed are of various forms and of various diameters. The Z and double Z or crown borers are those most used, but for some kinds of rock other forms are found preferable. The holes generally bored are about 1¼ inches in diameter, but some are much larger. In working through some of the very hard quartz it was found that the shots flew back from the ordinary holes without producing any disruptive effect on the rock, and the plan was therefore adopted of first boring several holes 4 inch or 5 inch in diameter and then disposing some ordinary holes round these. When the charges in the ordinary holes were fired the portions of the rock between them and the central hole were blown out, and a cavity thus formed around which other shot holes were bored. The borers used for the 4 inch and 5 inch holes are of similar form to smaller bars, and, like them, they are worked by the boring machines, but at a slower speed.

ON THE INFLAMMABILITY OF PETROLEUM AND SCHIST OILS.

Dr. Robert Peltzer has lately made experiments on the inflammability of different products of distillation which were derived from Pennsylvanian petroleum and bituminous schists from Autun, departments Saône and Loire, in France. The results of the same are the following:

PETROLEUM.

Density.	*Inflammability.* Takes fire at
0·643	−5·8° F.
0·686	−5·8
0·700	− ·2
0·740	+59
0·748	+60 8
0·750	+62·6
0·760	95
0·775	113
0·783	122
0·792	167
0·805	194
0·822	230
0·831	203
0·848	1 8
0 850	136·4
Crude petroleum of 0·802	59
Heavy oils from the distillation of kerosene	343·4
Paraffine of melting point of 129·2° F	429·8

SCHIST OIL.

Density.	*Inflammability.* Takes fire at
0·769	+0·4° F.
0·791	66·2
0 805	95
0·814	118 4
0·823	140
0·841	176
0·851	86·8
0·880	208 4
Portion solidifying at 59° F.	206·6
Crude schist oil of 0 882	82·4

The oils were heated in a small capsule over a water or paraffine bath, a thermometer being inserted in the oil and a thin burning wick being held over the same. The petroleum oils which were experimented upon were very differently obtained; a part of them was gathered directly from the cooling worms in refineries, others were obtained by fractional distillation in small retorts, and still others by evaporation of specifically light mixtures.

The first two samples of the density of 0·643 and 0·686 took fire at −5 8° F.: henceforth the inflammability diminishes until the density of 0·822 is reached. From this point we see it again increase. This remarkable fact is easily explained when we consider that the high temperature which is necessary to distill the oils of 0 822 is sufficient to produce a partial decomposition of the higher boiling oils in the retort. This admission is sufficiently confirmed by the experiments. When the distilled oils had reached the density of 0·822, the fire under the retort was drawn out. In producing a light oil of 0·8, distillers generally gather only the portions which come over up to this point; the first fractions which are used with the illuminating oil possess a specific weight of 0 750; the mixture does then not take fire below 96 8° F.

The remainder in the retort may be heated to 343·4° F. before it is influenced by a burning wick. When, however, after the distillate had reached the specific weight of 0 822, the heat was increased, as it is done for the production of lubricating oils, the inflammability also increased, as is seen from the foregoing table.

Refined paraffine of a melting point of 129·2° F. could be heated to 429·8° F. It then took fire, but without a prior decomposition being noticed, which obviously had taken place in the distillation of the heavy oils and crude oil-containing paraffine masses.

The schist oil samples were obtained from a distillation on a small scale. The same was carried out in a cast-iron retort of 2½ gallons capacity on naked fire. The oils were purified and from Autun. It is striking that the latter are a great deal more inflammable than the petroleum oils of the same density. Prof. Marx, in Stuttgardt, also indicates the inflammability of a schist oil, which he does not designate further, as being at 63·5° F.

It is highly probable that a similar decomposition goes on in the distillation of schist oils at a high temperature, only in a less striking manner than is the case with petroleum. Unhappily the choice of the experiments was very limited, and he particularly lacked the distillates from the crude heavy oils for the production of lubricating oils, otherwise the decomposition of the schist oils could have been more precisely determined. Upon this decomposition a process could certainly be founded for changing the heavy petroleum oils by a high heat (at least partly) into illuminating oils, as Mr. Breitenlohner, in Chlumetz, Bohemia, has already done with heavy peat oils.

From the foregoing table we notice a diminution of the inflammability with the increase of density, in case no decomposition has yet taken place by too high a temperature; but even an approaching relation between these two points is, however, not perceivable. If the greater or less inclination of the oils to inflame was simply dependent upon the boiling points of single fractions, which would represent more or less constant mixtures of hydrocarbons of the series, C_{2n} H_{2n+2}, as isolated by Cahours, Pelouze, and Schorlemmer, then a fixed relation between the inflammability and density would be the necessary consequence. This relation is, however, very probably concealed by a different degree of absorption of the single fractions for the highly inflammable gases which are to be found in the oils. A fraction which holds a certain quantity of gas possesses also a corresponding inclination to inflame.

For making the crude petroleum applicable and perfectly safe for the heating of steam boilers, it would be necessary to separate all the oils until the density of 0·783 is reached, and then to free it from the absorbed gases. Though oils may yet be present which are inflammable at from 122° to 167° F., their percentage is so small that the fluid will bear a heat of 176° to 212° F. without there being any danger of explosion. The oils below the density of 0·783 could be sold partly as kerosene, partly as essence for the so-called magic lamp.—*Dingler's Polytechnic Journal, Vol.* 189.

WHAT MAKES THE DIFFERENCE.

Almost simultaneously there have recently appeared, in a popular monthly magazine, and a daily paper in a neighboring city, articles upon the labor question. The magazine article is an able review of the subject, from a philosophical stand-point. The articles in the daily consist of a description of the life led by clerks in New York, and the tyranny of their employers, with confirmatory correspondence from a fancy-goods clerk, who has had a bitter experience, if we are to believe his own account, which we see no reason to doubt If late in the morning, five minutes, or if three minutes' late from his hasty lunch, at noon, he is docked one fourth of a day, while he is obliged to work during the time for which he receives no pay. He has thus been required to work fourteen hours, for only half a day's wages. His evenings are expected to be spent in drumming up trade, for which he gets no thanks or pay. He says his experience is that of other fancy-goods clerks when traveling. "His labors commence at sunrise, and are ended at twelve o'clock at night, or perhaps one o'clock the next morning, just in time to jump on the train, sleep in his seat, and at daybreak he is in the next town, to go through the same wearing routine." He follows these statements with thanks to the paper that has taken up the cause of oppressed clerks, and makes the following pathetic appeal:

"I speak from experience. This I have done for four years. I have traveled, with valises in hand, through rain or shine, hot or cold, from Portland, Maine, to St. Paul, Minnesota; from Grand Rapids, Michigan, to Selma, Alabama. For my services I draw the stupendous sum of nine hundred and fifty dollars per annum—and this from one of the largest notion houses in the United States You have spoken in our behalf. You have chosen to devote two columns of your paper to a purpose which must be philanthrophic in its motive, for favors like these are never bought by workingmen. I thank you from the bottom of my heart for the voice you have raised to befriend us as a community. I pray it may never fail until it has accomplished something towards its purpose, so that a man will not be ashamed to see his name in the directory stigmatized 'Clerk'—which now almost signifies candidate for the poorhouse."

Coupling this with the following figures from the magazine article to which we have referred, we shall get some additional light upon the subject:

"The census of 1860; shows in the State of New York 49,597 clerks, to 11,745 masons! And besides this is another curious fact, that, while the wages of the masons are $4 50 per day, those of the clerks do not average over $2 per day! See, also, how the non workers count with the masons in other departments: 11,745 masons only in the largest State of the Union, with a population of 3,880,735; but there are 3,679 barkeepers, 6,127 drivers, 5,592 lawyers, and 5,235 clergymen. . . . . .

"The three bricklayers' unions of New York city contain some four thousand members, each of whom pays an initiation fee of $25, and a monthly due of twenty-five cents. If injured at his work, the injured member is allowed $6 per week while disabled, and at his death his family receives $60. So far they are benevolent institutions; but in the event of a 'strike,' or other important movement, 'this union shall have power to levy upon its members for extraordinary purposes such tax or sum as may be at the time necessary, which tax shall not at any time exceed the sum of ten per cent on the net earnings or wages each member may be receiving at the time of such assessment.' This may and must bring in a vast sum; and I learn from one of the officers that, in this great strike at New York, in addition to the $25,000 in their treasuries, they have received from other unions and contributions some $150,000, a large portion of which has not been expended, or had not been at the end of the sixth week of the strike."

The magazine writer thinks he has expressed the secret of power in the trades unions, when he says, the demand for their labor, and the high wages which are consequent upon the demand, enables them to make up a large fund, and to help each other when occasion requires it; and, as far as that goes, he is right. The powerlessness of the clerks is also considered by him to result from their inferior wages; and this is also right, so far as it goes. The reason for the scarcity of mechanics and farm hands, and the glut of clerks, is attributed by him to the disreputable character of manual labor.

"Work is disreputable—is it not so? Else would not these thousands of poor clerks gladly leave two dollars a day to get five? Disreputable means, not in esteem, not honorable. Now, I ask, is it practicable for any bricklayer in this city of New York, or in any city known, to enter, to be one of what is called 'good society?' No matter how well educated or well bred he may be, the fact that he is a bricklayer does forbid his being accepted as a friend and equal by the men and women of good society. It is not easy to understand why stock gamblers are accepted in good society, master masons and carpenters not; why clerks at two dollars per day are marriageable, masons at five dollars a day not; unless that they are able to keep smooth hands and wear good clothes week days as well as Sundays. No one would claim that the clerks are more intelligent, more moral, more capable, better members of society than the masons; but the facts are as I state them."

Now, if these things are so, our nation is in a sad plight.

> "Ill fares the land, to hastening ills a prey,
> Where wealth accumulates, and men decay."

The effeminacy which leads to a dislike of honest, manual labor, never exists except at the expense of manhood. There is a fashionable class in this country, doubtless, to which neither the mason, with his five dollars per diem, nor the clerk, with his two dollars, would be eligible. Beyond this we know of no society where a clerk would be received, and a mason or carpenter excluded. It may exist, but we have not discovered it. Our magazine article does not locate this society, or define its boundaries Certainly, it is not in rural districts; and, if in cities, where is it to be found. Evidently, if it exist at all, it must be among that class which is the pest of all large towns—the class who gamble, pick pockets, sell lottery tickets, keep intelligence offices, and contrive to keep up a sort of style upon the ill-gotten gains of such and similar occupations. But our author does not, of course, mean this class, when he speaks of good society. We are inclined to think the society he means to be a creation of his own imagination.

But if work is not disreputable, whence the glut in those professions which do not involve manual labor? A powerful cause, entirely overlooked by this writer, exists in the exaggerated ideas which prevail in rural districts in regard to the pleasures of city life, and the chances which exist in large towns for rapid advancement in all professions. Instances of extraordinary success are circulated far and wide through the country papers, while the numberless wrecks of health and morals, or the innumerable disapointments, privations, and humiliations to which the larger portion of young men who go to cities in search of employment, must be subjected, are unrecorded. It is true that men of extraordinary talents, find greater scope and larger remuneration in cities than in country towns. But all youths have not extraordinary talents, and the advantages which are secured by a metropolitan life are only to be obtained by pluck and perseverance, perhaps so severely tried ere success is reached, that the prize, when at last it is grasped, comes too late to be enjoyed. The country lad, as he follows his plow, or sits resting beneath the shade, after a day of physical toil, cons over the stories which his cousin from the city has told him, and its splendor and fancied ease, seem so alluring in comparison with his life of healthful labor, that he flies toward it like a moth to a candle, and has his wings singed. In the majority of cases he never recovers himself. He becomes enamored of the theaters, the concert halls, and the many other agencies always found in a city, which corrupt his tastes if not his morals. He becomes effeminate, neglects mental improvement, and gradually degenerates into a miserable, worn, and whining drudge, like the clerk in the notion house, who so piteously makes his moan to the Brooklyn daily.

Out upon you, man, if you have enough left in you to call a man! What business have you to be a fancy-goods clerk? Go into the country, and swing an axe, or into the forge, and wield a the hammer, and recover your lost manhood. Don't sit here, whining, like a whipped puppy, about your insufficient salary. You are getting now more than women ordinarily get. Before we would engage in such a paltry occupation, we would carry a hod. What were your muscles made for? Why do you disgrace your sex by peddling dolls and baby toys, when you should have been a producer of wealth by your labor or your brain? We have only the sympathy for you that arises from a consideration of your weakness. You have not force of character enough, neither have your class, to make an effectual strike. You have not the brain to organize, nor the physical power to endure. The bricklayer has both, and so he can hold out when he sets about it. This is the main source of his power. His habits of life make him both clear headed and plucky; and although we doubt the wisdom of such organizations as bricklayers' unions, we admire the courage and manhood of the bricklayer, as much as we hold your weakness and occupation in contempt.

FIFTEEN trains, averaging 35 cars each, and carrying an average of fourteen thousand bushels of grain each, pass daily over the Chicago, Burlington, and Quincy Railroad.

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Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Board of Examiners in the Patent Office.

MESSRS. EDITORS:—The new Commissioner of Patents has thus far exhibited a zeal and determination in the discharge of his duties which has arrested the attention of the public generally, and augurs well for the success of his administration. To none of his contemplated improvements, however, do the public give a heartier and more cordial endorsement than the resuscitation of the Board for inquiring into the qualifications of the Examining Corps. Those who compose this body, decide upon the merits and patentability of all inventions, and to them the law contemplated the application of a rigid and searching test-examination. While the form and letter of the law, in this regard, was for some years complied with, the spirit and substance was evaded, since those who were subjected to an examination declare it to have been a mere formality.

Of late years, however, it has been entirely omitted, and virtually declared obsolete. Its death and burial is believed to have occurred about two years ago. Upon the accession of Judge Foote, it was with commendable promptitude resurrected, galvanized into new life, and imbued with a true and catholic spirit.

The object of the law was manifestly to debar incompetent men from securing these responsible places, to cause emulation in the acquirement of an Examiner's duties, and to eliminate and bring to notice the men who possess capacity, educational acquirements, and aptitude. The duties of an Examiner are of a character complicated and diverse, so much so as to demand unusual qualifications.

He is called upon to analyze claims, to extract the meaning from specifications oftentimes diffuse and obscure, and to embody ideas in language exact and perspicuous. This necessitates an acquaintance with the etymology of his own tongue, and the languages from which its compound words are derived; he must also possess some mathematical knowledge to enable him to understand readily the combinations of mechanism, and the infinite relations in which mechanical elements may be placed; he must be moderately well grounded in the general and leading principles of science, or he will not be able to penetrate and discern the purpose and gist of a large class of cases which come before him. He should therefore be a man of liberal education, and of more than ordinary capacity. Without these qualifications, he is unable to do justice to the public in whose behalf he acts, or to the inventor on whose rights he renders judgment. Without these qualifications, the spirit of the law cannot be carried out, but wrong and injustice must be surely done.

The Commissioner is responsible, whether he appoints incompetent men himself or retains the appointees of others in their positions. It is upon this view that the public has hailed with so much satisfaction the appointment of Messrs. Hodges, Taylor, and Jayne as a Board to ascertain the qualifications of Examiners and their Assistants. The men selected and the instructions issued indicate unmistakably that this is no sham, but that the Commissioner is thoroughly in earnest, and fully determined to raise the standard of qualifications to the point intended and contemplated by the law.

Thus far, then, those interested in the Patent Office have every reason to expect from the new Commissioner many and radical improvements, and to entertain the hope that at last the right man has been put in the right place.

It is true that there are those who seem disposed to doubt whether the Commissioner will apply this discriminating test without fear or favor, and to all alike; whether he can carry out, sternly, a revolution which will razee or throw out altogether some of the primary Examiners, men who, however incompetent, are morally and socially estimable Nothing but a high sense of duty and a Roman firmness will enable any man, in such a position, to emancipate his judgment from the influence of his own feelings, and the appeals of interested parties. Such a "*rara avis*" the new Commissioner is believed to be, who, when he prepares for work, throws off his prejudices and predilections as garments that hinder and interfere with the performance of duty, and meets obstacles with stoical calmness and unflinching resolution. With such a man, it is not believed that exceptions of one and another will be allowed to fritter away the substance of the law, but that all will alike be subjected to the test-examination except those whose superiority is indicated and acknowledged by an appointment on this Board.

If this is done, a great reform will be inaugurated, a maximum in thoroughness and efficiency of examination attained, and a corresponding confidence in the decisions of the Office created.

T. P. S.

Center of Gravity in a Vertical Revolving Wheel.

MESSRS. EDITORS:—Your treatment of my theory of a vertical wheel in motion, and Mr. Riordan's endorsement of it in your issue of the 16th inst., is, in my opinion, open to criticism. I hold, that although the center of gravity and that of revolution coincide in a vertical wheel in repose, the former is separated from the latter, when the wheel begins to rotate, and is to be found on that side of the axis where the particles composing the mass are falling down in the line of gravitation—a fact, not only in accordance with known laws, but demonstrated by one of the motions of the gyroscope. You object, that, according to this theory, a nicely balanced vertical wheel once set in motion should rotate forever; evidently assuming that the center of gravity, when shifted to a point sufficiently removed from that of revolution, to overcome friction, etc would be able to sustain itself there, and, by its constant influence, cause the mass to revolve perpetually. By way of maintaining this view of the case, and while exclaiming "like causes produce like effects," you instance the constant rotation of an overshot wheel, where the center of gravity is shifted from that of revolution, through "a continuous application" of a given weight of water, and mention, also, the fact of two heavy cylinders being so delicately balanced as to require the weight of a single tenpenny nail only, to cause them so revolve; intending to argue, thereby, that it would be difficult to imagine the shifting of the center of gravity in any heavy wheel to a point where it would not exert as great an influence, at least, as a tenpenny nail attached to the periphery. Gentlemen, does it not strike you here that you had to *reconstruct* your wheel and cylinders before you could make them rotate, by adding to their weight on one side, to the amount of the force necessary to disturb their centers of gravity; while, according to my theory, the center of gravity is separated from that of revolution, without increasing the weight of the rotating mass upon its axis, in even the slightest appreciable degree? Although the effects resulting from secondary causes—the disturbance of the centers of gravity—are alike in both our revolving masses; yet, where, gentlemen, are the like primary causes—the one being a constant and uniform force exercised by the external pressure of a given quantity of matter, and the other being simply a variable measure of momentum proceeding, as in the gyroscope, from the center of revolution, and embarrassed by friction, the resistance of the atmosphere, and the antagonisms of gravitation until finally destroyed by them.

As the ninety-nine hundredths of the mass of a vertical wheel may be centered in its periphery at a distance from its center of motion, your observations upon the influence of the center of gravity, as coincident with that of revolution in the mass itself, do not. I respectfully submit, affect my theory in any degree whatever. I shall therefore, with your permission close these few sentences by informing your versatile correspondent, Dr. P. H. Van der Weyde, that although I could desire his observations (in your issue of the 23d) on this hobby of mine were more intelligible, he is perfectly correct where he states that this theory is not new, as ten years ago it was mooted in connection with the gyroscope, for precisely at that period, or perhaps a year or so prior to it, it was first introduced to the people of this continent through the columns of the Toronto *Leader* and those of the New York *Times*.

JAMES MCCARROLL.

[We give our correspondent an opportunity to vindicate his absurd notions, but it is very evident that his ideas are somewhat muddled.—EDS.

Perpetual Motion Humbug.

MESSRS. EDITORS:—When I received my SCIENTIFIC AMERICAN last week, I noticed in it an article from a Wilkesbarre paper, which advocates in the strongest terms the invention of a "perpetual motion," which was first exhibited to the public in the city of Reading. It has created considerable curiosity and discussion in some sections of the country, and a number of letters from abroad have been received by persons in this city, inquiring into the reality of the machine. If it is any satisfaction to your readers to know the convictions of one who has examined the machine intelligently, calculated its powers from actual measurement, and has fully investigated the principles upon which it operates, I will furnish a brief statement of its principal features.

The inventor of this seemingly incomprehensible machine tells his curious visitors that its power is in a lever, one arm of which is 10½ inches long, the other 11½; and, by a course of sophistical jargon, he persuades many persons to believe that a 4-ounce ball, 10 inches from the fulcrum, will raise another 4-ounce ball 11½ inches from it. This machine has over fifty places of friction; and with this disadvantageous lever, he overcomes all friction, and acquires such a power that I know of but one man in this city—and he is a strong, robust, and rough-handed mechanic—that could stop the machine, by applying his thumb and forefinger to an axle ⅝ inch thick.

The leverage of this "self mover" consists of two levers, in the form of the Roberval Balance, invented by Roberval, a French geometer, about the year 1660, connected by a simple lever. By the paradoxical appearance of this balance, some of the most intelligent men may be deceived at first sight, and induced to believe things contrary to the established philosophy and the plainest common sense, until, after sober reflection, they understand the principles upon which it operates.

In "Silliman's Physics," page 87, the inquirer may find some information; but in "Smith's Mechanics," page 111, is the exact form of the lever of this "Self Mover," and a plain demonstration of its power, which is precisely the same as that of the simple lever. "In Roberval's Balance, equal weights balance at all distance from the upright stem;" and those persons who believe everything they hear, are easily persuaded that a ball of 4 ounces, 10½ inches from the fulcrum, will balance another 11½ inches from it; but in this balance it does not matter at what distances from the upright stem the weights are suspended, they always move through the same spaces in the same time.

The philosophy of this "Self Mover" is as follows: One ball descends about 10 inches on the arm of a lever 10½ inches long, and raises another ball, of equal weight, about 11 inches on an arm 11½ inches in length, and drives a complicated machine. But this is preposterous, and every sane man says on such principles no machine would work unless moved by some concealed power. The questions then arise, where is the concealed power? and why is it not discovered by some body? The inventor has made, and carries out a wise rule to avoid detection; he permits no one take his machine apart. For the information of those persons who may see it hereafter, I would state, that a certain machinist in this city recently showed me a drill which drills a ¼ inch, large, hole, with which he drilled a hole through one of the columns, and this, I think, solves the mystery. This feature in the construction of the "self mover" is invariably omitted by its keeper A spring and clockwork must be concealed in the bulky frame upon which the machine is screwed, and communicates with the wheel work above, through the column. The wheel moves the levers, and not the levers the wheels; and the balls have nothing to do with the machine, but to distract the mind of the observer from the real source of power; besides, the machine will run better without the balls. The "self mover" is a humbug.

Reading, Pa. D. B. BRUNNER.

[Some years since, a mechanical contrivance, very similar to this, was exhibited as a perpetual motion. We stated at the time, and it was afterwards proved that it was operated by some concealed power. The inventor would not permit any one to handle it.—EDS.

Linen Finish on Paper Collars.

MESSRS. EDITORS:—In a recent article on paper collars, you stated that the process of producing the "linen finish" was kept secret. I inclose for your examination a "linen finish" collar, which has been lying in a drawer containing a few lucifer matches. If some other material could be substituted for the large amount of *lead* used in preparing the finish, perhaps the process would no longer remain such a profound mystery.

I have submitted several samples of various brands of linen finish collars to the vapors of sulphureted hydrogen In every instance they were *completely blackened.*

THOS. L. OLDEN.

[The paper collar submitted to us was badly blackened, but our correspondent is not warranted in inferring lead to be a constituent of the linen finish on paper collars from that circumstance alone; or from the effect of sulphureted hydrogen, unless confirmed by other tests.—EDS.

Grain Thrashing Machinery.

MESSRS. EDITORS:—I would like to inquire, through your journal, whether there is a thrashing machine made that cleans grain fit for marketing. I am acquainted with quite a number of separators, including the Pitts, Case, Sweepstakes, Halls, Geiser, Clipper, but among all not one will completely prepare the wheat so that it will pass without great reduction in price on account of straw and chaff. In fact, no machine can clean grain in which the fanning mill takes wind down among the straw, as they all do, so far as I am acquainted.

Is there a machine made with an additional cleaner, on top of the separator proper, into which the grain is elevated by an extra elevator for that purpose?

This is a matter of serious importance to our wheat-growing districts. Millions of dollars are expended in cleaning grain which could and should have been filled for market when it left the separator. Most of our farmers now run a common fanning mill in the field and clean the grain as fast as thrashed, taking two extra hands.

I hope this may receive attention. WM. B. REED,
Hastings, Minn.

Desiccated Sweet Potatoes.

A correspondent from Vicksburg writes in regard to the above subject: "The whole world needs more food. We can raise and dry sweet potatoes at a cost of sixty cents per bushel, and ship them to all parts of the world. Every ship on the ocean would soon have them on board as the best preventive of disease and the most nutritious food in the world. All sorts of mean vegetables are ground up and parched and sold to the poor for coffee. Nothing known will make so good an imitation of coffee as the yellow yam sweet potato. All parts of the Northern States will soon learn their use, and find them for sale as we now find dried peaches, apples, etc. The revenue to the South from this source is destined to eventually equal that from the cotton crop. They contain a large amount of saccharine matter, which renders it necessary to keep them from the air, as otherwise they will attract moisture and become moldy."

Why Run Up Stairs.

We do not run in the street, nor in the park or garden; why then run up stairs, and then complain that the stairs are so high? It is difficult to answer this question; nevertheless English people generally do run up stairs, while foreigners are well satisfied with walking up. Servants frequently complain of the hight of the stairs, and leave their places in consequence. Houses of six and eight stories are now built in England, as they are in Paris and Edinburgh. Now, there is really but little more difficulty in ascending several flights of stairs than there is in walking a straight line, provided we take sufficient time to do it, which should be about twice as long as we should be in walking the same distance in the street. Walk up stairs slowly; rest at each landing; again walk steadily; and you will reach the top flight without exhaustion or fatigue.—*S. Piesse.*

PHILOSOPHERS IN COUNCIL.—M. Leonardi, a learned savant of Prague, invites all philosophers by profession to assemble in that city. They are to be received hospitably, and without distinction of doctrine. The sittings will last a week, and the questions to be treated are to be metaphysical So much so, no doubt, that the world will be confounded by the wisdom of Leonardi and his astute associates. We advise Peter Yates, of Milwaukie; J. K. Fisher, of this city, and some of the disputants at the Polytechnic Institute, to go out as delegates.

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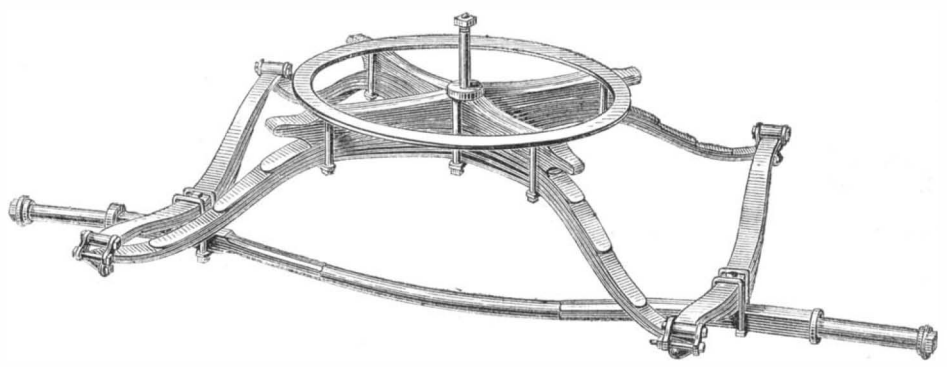
Improvement in Carriage Springs.

The engraving represents a combination spring for carriages intended to equalize the strain or distribute the load. The leaves of the two principal springs, supporting the swivel plate, or "fifth wheel" have their leaves diagonally crossed and interwoven, the central portion of the combined spring being bolted by clips to the bolsters to which the swivel ring is secured. The ends of these diagonal springs are connected by shackles to two side springs secured to the axle in the ordinary manner. The forward pair of shackles have ears with bolts to receive the shafts of the carriage. If desired, the ends of the springs may be bent edgewise, the side springs outward and the cross springs inward, so that the holes in the cross springs will stand parallel with those in the side springs, and thus they may be bolted together in the same manner as the ends of elliptical springs usually are. This construction is adapted for the rear ends of some vehicles, or for the front end when a standing pole is used and fitted in the ordinary manner. A standing pole may be used by having a bar attached to the front ends of the springs, reaching from one to the other and secured to the ends in the same manner and by the same bolts as are the shafts. On the center of this bar the standing pole is fitted, the back end passing into a socket securely fastened to the cross springs. Of course, the manner of attaching the pole may be varied to suit the style of the carriage and the taste of the workman. This combination of springs is claimed to be stronger, more durable, and as cheap as the ordinary springs, while it will allow the draft to be attached lower down.



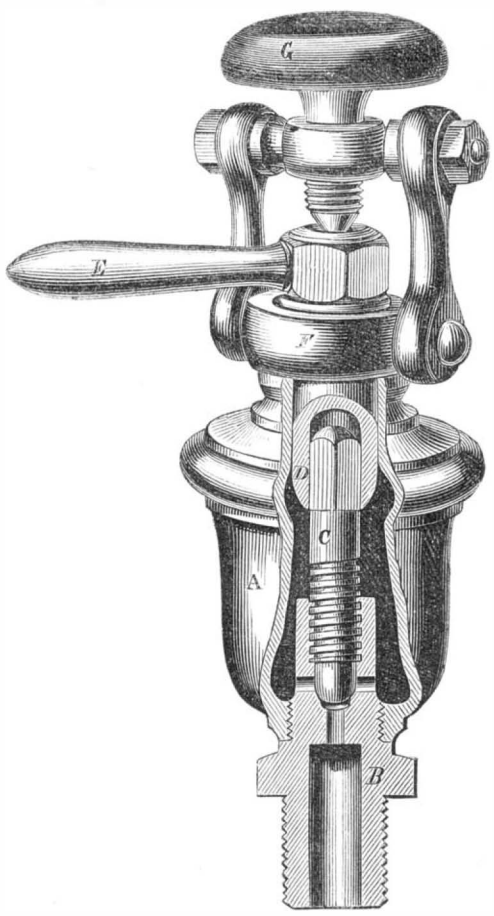
SUTTON'S COMBINED SPRING FOR VEHICLES.

This style of spring is intended to supersede the old fashioned wooden frame work, and thus do away with the ironing on the same. The bolsters are two pieces of wood halved on each other in the center, and clipped to the springs to deaden the jar. Manufacturing, County, and State rights are for sale, and agents are wanted.

Patented through the Scientific American Patent Agency, August 25, 1868, by Charles D. Sutton, of Tarrytown, N. Y., who may be addressed for additional information.

ROSS' PATENT OIL OR TALLOW CUP.

In oiling the cylinders of steam engines, while in operation, the ordinary single valve oil cup is not effective, as the pressure of the steam will force up the oil or melted tallow



causing it to escape from the cap, or the annular space around the cock, sometimes blowing the cap off and stripping its thread. There are objections, also, to the double cock oil cup, from the difficulty of keeping the cocks tight; and others, of a complicated construction, are objectionable, on account of their complication.

That, however, shown in the engraving, appears to be simple and effective, and free from objectionable features. A brief description will show its plan of operation. The engraving is partly in perspective, and partly—the broken out portion—in section. The globe or oil reservoir, A, is similar to those ordinarily used, the stem or branch, B, being screwed into the bottom of the cup, and having a portion of the branch extending up into the cup, that portion threaded to receive a vertical screw, C, the lower end of which is made to form a valve in connection with a seat in the branch, B. Passages lead from the cup by holes in the branch, B, to the communication with the steam chest, so that when the valve, C, is raised from its seat, there will be a communication opened between the oil cup and the steam chest.

A socket wrench, D, fits on the squared head of the valve, C, and by means of a handle, E, on its shank, it may be turned to seat the valve, or open it. The shank of D is ground to fit the neck of the cup, A, so as to make a steam tight joint, yet allowing the free turning of the shank, by the handle, E. These appliances show plainly how the communication between the cup of the oiler and the steam chest may be made and governed.

To prevent this communication from extending to the outside of the cup, there is a ring, F, which screws on the neck of the cup, and is provided with trunnions, to which are pivoted bars connected with a yoke, through which a threaded screw passes, having a hand wheel, G, at the top. The use of this screw is to hold the wrench, D, to its seat, preventing communication between the steam chest and the atmosphere, when the valve, C, is raised from its seat.

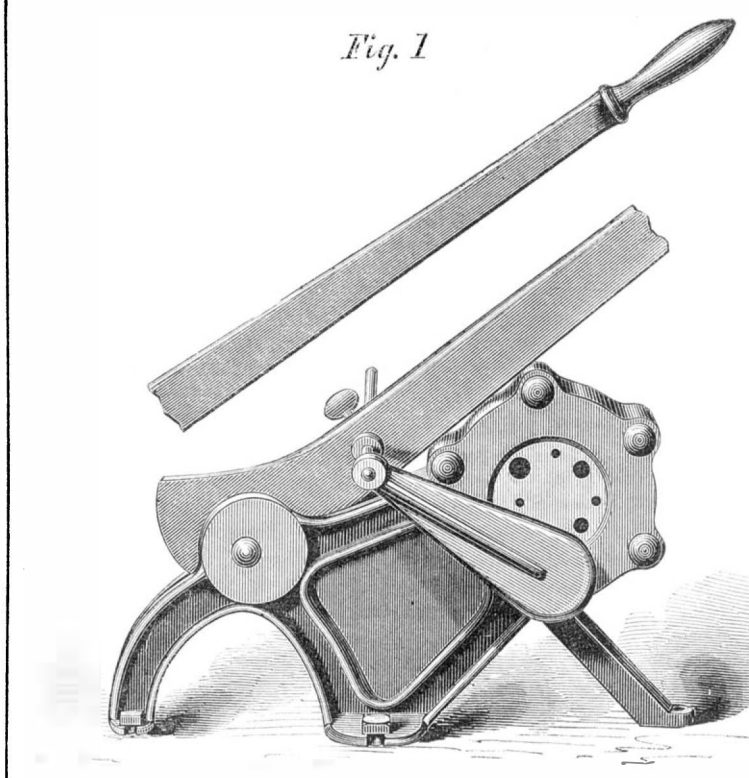
In charging the cup with suet, tallow, or oil, the valve, C, is seated by means of the handle, E, when the hand wheel, G, is unscrewed, and the yoke and its hand wheel and screw turned on the trunnions to a position at right angles to the cup, so that the wrench, D, may be lifted out. This opens the cup for the introduction of the lubricant. After filling, the parts are restored, the yoke elevated, and the point of its screw seated in the depression on the top of the wrench stem, D. This is then turned by the handle, E, sufficient to open the valve, C, when steam enters the cup, and forces the lubricant into the steam chest and cylinder. The wrench, D, may be raised slightly without permitting the escape of steam, as its shank has a ground bearing for a considerable portion of its length. The seating of the screw of the wheel, G, does not prevent the partial rotation of the valve, C, to raise it or reseat it, and the amount of lubricating material admitted to the steam chest can be accurately regulated by the amount of this rotation.

Patented, August 25, 1868, by Robert Ross. Address B. E. Lehman, agent and manufacturer, for further information, at Bethlehem, Pa.

Improved Machine for Cutting Wire.

In the machine shop, the foundery, and other departments of the iron manufacture it is necessary frequently to cut wire and rods for rivets and similar purposes, and in the smith's shop the cutting of bars to proper lengths entails considerable time and labor. The use of the cold chisel, file, and even the shears and the spring cutter are all more or less objectionable. The reason is that, whether the metal be cut by the chisel, file, or ordinary shears, the transverse face is either burred, cut away on its edges, or left diagonal to the length of the bar, rod, or wire, so that filing or other dressing is required before the cut piece can be used.

The machine illustrated in the accompanying engravings is built upon a principle that, from experiments we have made with a working model, is seen to be the right one. Fig. 1, shows the machine as for use in a boiler shop or machine shop, capable of cutting bars, square as well as round, by hand, of one inch or one and a quarter inches diameter, as well as wire. Fig. 2 shows a section of a small bench machine exposing the simple mechanism, and Fig. 3 is a vertical transverse section exhibiting the principle of the machine in the slashed direction of the receiving hole.



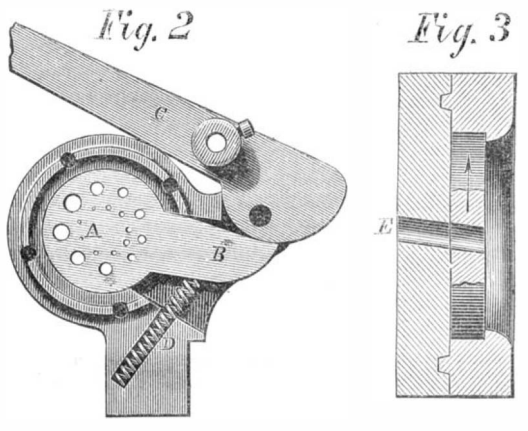
FLINN'S WIRE AND ROD CUTTING MACHINE.

The device is a case, consisting of two disks of cast iron bolted together, one of which has seated in it a hardened steel die, immovable, preferably of an octagonal form. The other holds a movable die, A, having a projecting tongue, B, against which, on one side, the cam or eccentric end of the lever, C, bears, and on the other side a light spiral spring, D, for returning the movable disk to place, when the pressure of the lever, C, is released and it is moved back ready for another cut.

But the grand idea in this machine is that the hole through which the bar or wire to be cut is passed is not at right angles with the face of the cutting dies, but drilled at a slight angle to the face. This is seen, E, in Fig. 3—exaggerated to give the idea more perfectly—the arrow showing the direction of the movement of the rotating die or disk.

In all cutting machines the diameter of the receiving hole must be somewhat greater than that of the wire or rod to be cut, for the facility of introducing it, and if the hole is made at right angles to the faces of the cutting dies, the rod will be thrown into an oblique position, and when cut, the fracture will be also oblique. In this machine, however, as we have tested, the cut end is perfectly square, without indentation or burr and ready for immediate use, as rivets, etc.

Square holes may be made in the dies, and square rods or bars



may be cut with equal facility. The smaller sizes of this machine may be used by being screwed into the jaws of a vise, or attached to a bench. The gage for length is attached to the lever, C, and is adjustable by means of a set screw. Being attached to the lever, it is not in the way when the cutting has been performed, and it allows the pieces to drop, coming into action only when the dies are in position to give a line through their corresponding holes.

This improvement is the subject of two patents dated May 8, 1866, and June 11, 1867. Farther particulars may be obtained by addressing, A. H. Saunders, manufacturer, Nashua, N. H.

Color Blindness.

Color blindness is much more common than many suppose, and considerable attention has been given to the subject in France. M. Fournet knew two students of the *Ecole des Mines*, who, having no clear idea of colors, were unable to distinguish the various minerals, and one of them having to use a carmine wash in some drawing, used Indian ink for the purpose. In a long treatise, Dr. Potton, of Lyons, has ranged in the same category a large number of shopmen who were obliged to be dismissed for the simple reason that they could never distinguish the various shades of the stuffs which they had to sell. As this aberration of sight had been the cause of grave errors on railways, the companies' surgeons at present are most particular in testing on this point the candidates for employment. Dr. Favre, at Perrache, stated that the number of applicants whom he has been obliged to refuse because they were incapable of distinctly telling a green light from a red one was very considerable. Men who are employed to attend railway colored signals in this country ought to be examined on this point.

It is said that Chinese compositors are now employed at Hong Kong to set type in the English language, of which they are totally ignorant. They set up both manuscript and reprint, without the faintest idea of what they are placing in type, and are said to do their work rapidly and accurately. The statement seems almost incredible, but it is said to be literally true.

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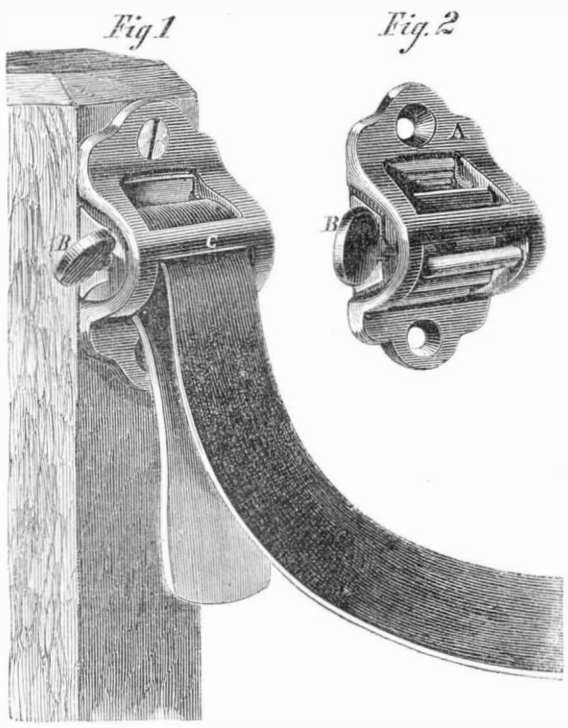
MIDDLETON & HALLER'S SAFETY HORSE HITCH.

The art of quickly making a knot in a halter or grog rein is one that must be learned, and there are occasions, as in severely cold weather, when the benumbed fingers of the most expert bungle. The little device herewith illustrated prevents this annoyance, and it is as cheap as a ring, hook, or staple, and can be as easily attached to a post, manger, trough, or other object. Beside the two screws by which it is secured, the whole contrivance consists of only three pieces of common cast iron, requiring no preparation, after casting, for use except cleansing them from sand by means of the rattle box or by hand. The parts may be seen in Fig. 2. A is the shell, and B the tongue, which is held in place by a central back piece fitting into the rear of the shell. Fig. 1 shows the hitch attached to a post and holding the end of a strap. This is inserted under the bar, C, while the tongue is in a vertical position, as in Fig. 2, and then a light jerk partly revolves the tongue, bringing its lower edge against the strap and confining it between the tongue and the back piece, which is corrugated. To release the strap the tongue is turned by the thumb piece, B, to a vertical position and the strap pulled out. Among the advantages claimed, and which are obvious on examination, are its cheapness, costing but a few cents; its entire reliability, as the greater the strain on the strap the stronger it will be held; its durability; ease and quickness of handling, a woman or child being able to hitch or unhitch a horse instantly, and its adaptability to all circumstances in which it is desirable to hitch an animal. It may be used also to fasten clothes lines. Patent issued Aug. 11, 1868. For State, county, or manufacturing rights address H. C. Demming, assignee, Harrisburg, Pa.



REPEATING FIRE-ARMS.

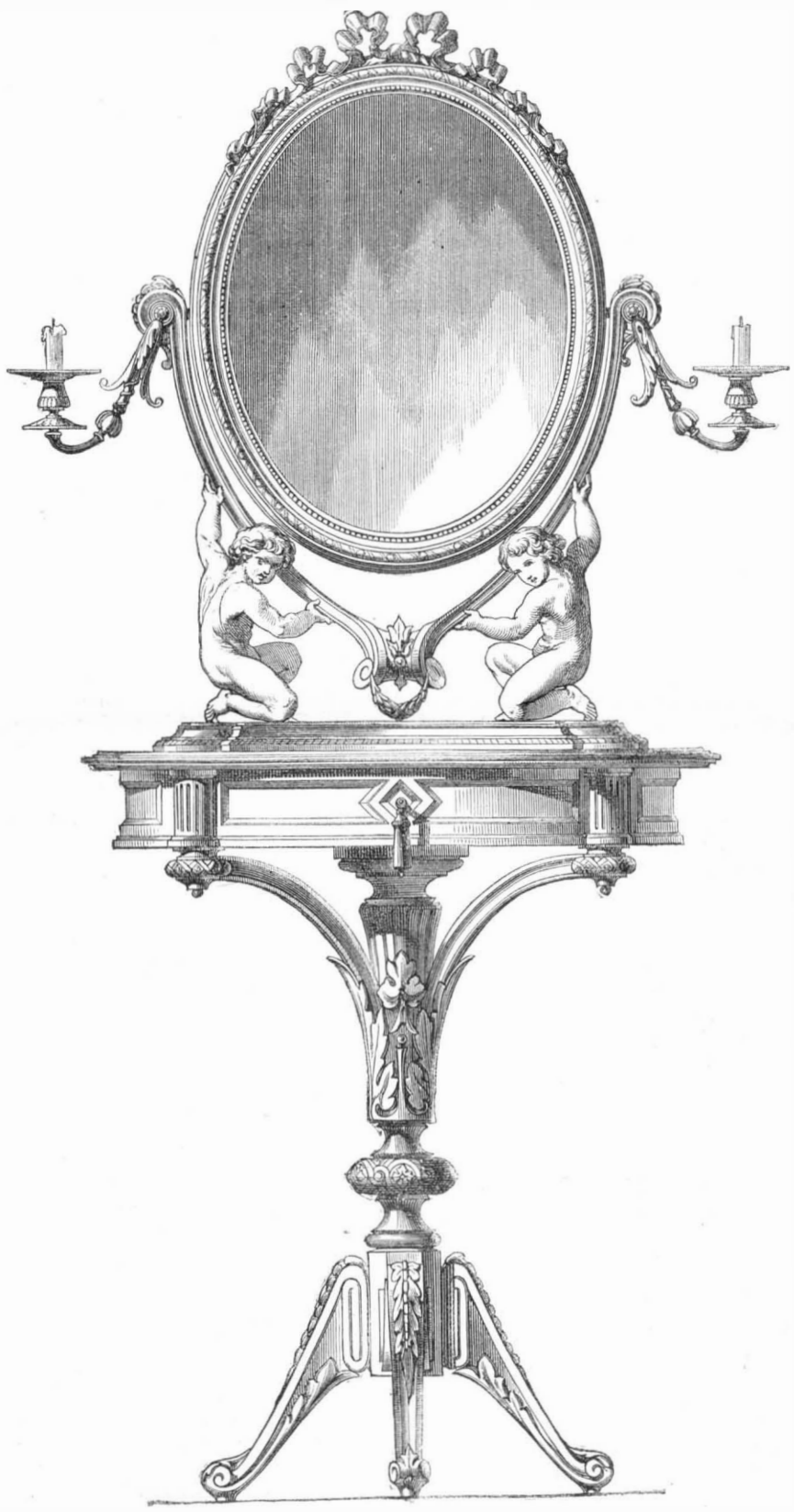
It is not too much to affirm that the day of muzzle-loading fire-arms for war purposes is passed. Indeed, the breech-loader seems destined to give place to the repeating rifle, which, however rapidly it may be emptied, shall require but a fraction of a minute to be loaded. All time spent in loading in battle is time absolutely lost, during which the soldier is a defenceless target. That piece will best subserve its purposes, which—other things being considered, reliability, safety, and strength—shall require the least time to load and discharge, with accuracy, the greatest number of shots in a given time. Accuracy, power of penetration, range, etc., are independent of the mechanism necessary to rapid firing, and may be possessed by the muzzle loader as much as by those pieces which may be rapidly discharged. There is nothing in the preservation of these qualities which preclude the possibility of a quick firing piece.

The mechanics of this country have produced, probably, the best small arms, and the best machinery for their manufacture, in the world. This broad statement is borne out in the one case by examining the published results of practice with European arms, and the results of competitive trials between rifles of American and European manufacture; and in the other case by the fact that in only one of our establishments building gun tools—that of Pratt, Whitney & Co., of Hartford, Conn.—the bulk of their work for two years past, and their prospective work for a year to come, has consisted in the filling of orders from continental powers for gun-making machinery.

We have lately examined the Winchester repeating rifle, manufactured in New Haven, Conn., which was submitted to a series of trials by the Federal Military Commission of Switzerland, appointed to test and report upon a suitable arm for the troops of the Confederation. The result was a recommendation of the Winchester gun, for the arming of the Swiss sharpshooters. When it is considered that the Swiss are unexcelled as riflemen, the significance of this selection cannot be misunderstood. The piece is an improvement on the Henry rifle, so well known and appreciated by sportsmen, consisting mainly in an automatic arrangement for discharging the cartridge shell, and the method of filling the magazine, which extends along the length of the barrel, on the underside, is closed at the top, and fixed to the barrel. In the ordinary rifle this will hold twenty-two cartridges, which may be delivered to the barrel, fired, and the empty shell dislodged by only two motions of the right hand. The magazine is charged at the side, by the lock, and, whether full or empty, the piece may be used as a common breech loader. Thus, while the soldier or hunter may carry over twenty charges for cases of emergency, he can use his piece, at the same time, as a breech-loader, retaining the magazine charges. The breech contains a cleaning rod for the barrel, in four sections, easily put together for use, and detached for replacement. The rifle is elegant in appearance, compact, strong, and of excellent workmanship. On examination, we find its working parts very simple, and not apparently liable to derangement. As yet we have not tested its accuracy, range, or penetration, but have heard good accounts of its good qualities in this respect by those who have.

DESIGN FOR TOILET TABLE.

We herewith publish from the *Workshop*, a design for a toilet table. The study of such designs must be beneficial to all who are interested in the arts of cabinet making or wood carving. This one in particular will attract attention for its delicacy and richness. A general fault in designs for rich furniture is that they are overdone. The one we now present has a unity pervading the entire composition. At the same time it is free from all meretricious decoration. It will repay study.



ENGRAVING FOR CALICO PRINTING.

On page 317, Vol. XV., SCIENTIFIC AMERICAN, we described the process of engraving rollers for calico printing as generally employed some years ago. Much of the engraving then done was by means of "dies," "mills," "clams" (vulgar for "clamps?"), and "machines;" the die with the recessed pattern, giving its engraving to the mill in a raised pattern by means of the clams, and the mill by the machine impressing the pattern on the copper roller.

Beside these methods there was the talent of the bench engraver needed; not only he who first, from the "sketch" engraved the steel dies, but he also who by means of transfer patterns engraved the printing (copper) roller itself. Almost all these, as well as the "clammer" and the "machine engraver," have been superseded by a simple machine worked by girls. Engraving was once a costly process, and engravers received very large wages. The term of apprenticeship was not less than seven years, and the rules that governed the craft—employer as well as employed—very strict.

All this is changed, and engraving, except in preparing the patterns, has become mainly a series of simple mechanical processes. The designer must, as before, make a sketch—an outline—and also a pattern—the device in colors. From these the engraver copies on a plate of zinc the pattern, generally enlarged five times. The lines of the pattern are deeply sunk into the metal, with upright or abrupt edges forming the outline. This is a guide to the after process of marking the roller for engraving, and the colored pattern is placed before the eyes of the operator to enable her to see if her manipulations are correct.

It would be difficult to describe the machine used for this purpose without diagrams, but we will endeavor to convey an idea of its *modus operandi*. The roller to be operated upon is covered evenly with the usual etching ground or resistant, its surface being perfectly plain and smooth. Mounted on a mandrel and placed in the machine so that it may revolve freely, the roller with its mandrel is connected to a vibrating frame having an arm, in one end of which is a fine diamond that may be brought in contact with the face of the roller. The deeply engraved zinc pattern is fixed to a table in front of the operator, who guides a point attached to the vibrating frame across the engraved depressions of the pattern; the arm holding the diamond following each movement and scratching through the etching ground, laying bare the copper, and forming the pattern, reduced to one fifth the size of that on the zinc plate. This process is repeated until the roller is covered with the pattern reproduced many times. The after process is the etching the same as that heretofore employed. The roller is suspended on journal boxes in a trough containing diluted nitric and sulphuric acids and revolved. It will be seen that wherever the diamond has scratched through the etching ground the acid will act upon the copper, while the unengraved or unscratched portions will not be affected, the copper being defended from the acid by the resisting ground. The hatcheled or "slashed" ground of the engraved zinc pattern is faithfully reproduced by the diamond in the machine and as faithfully preserved in the process of etching, so that when completed, the engraving on the roller is as perfect in every respect as that done by means of the mill and machine.

One would suppose that this simplifying of the before costly processes of engraving would have greatly cheapened the cost of calicoes, but the price of prints in the market does not seem to favor that idea.

Sir John Franklin.

A clue to the mystery enveloping the fate of Sir John Franklin and his fellow voyagers amid the ice-bound regions of the Arctic zone, seems to have been discovered. By the recent arrival from the Polar regions of Dr. Goold, of Dublin, late and interesting intelligence is afforded respecting the search now prosecuted by Captain Hall for traces or remains of the *Erebus* and *Terror*, and their crews. In August, 1867, Captain Hall was at Repulse Bay, preparing an expedition to King William's Land, where, from information obtained from the Esquimaux, it seems, beyond doubt, that important records, and some relics of the Franklin expedition are still preserved. The point to be reached was four hundred and fifty miles north of Repulse Bay, and in a country, the inhabitants of which were known to be hostile to Europeans and to the Esquimaux, living at Repulse Bay. It was the opinion of the latter, who are known as King Albert's followers, that Franklin's men had been killed by King William's men. Accord-

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ing to native information, the last six survivors of the party built a cavern or rude vault of stones,and deposited it it some documents and such articles as they had no use for, or would be an incumbrance to them in their journey southward. It is Dr. Hall's object to reach this depository, and from his well known reputation for intrepidity, energy, and endurance. it may be presumed that no dangers or hardships will deter him from his purpose.

It will doubtless cause a thrill of mingled surprise and sorrow to learn that, after all that has been done to discover the Franklin expedition, two of its members survived to as recent a period as 1864. These were Captain Crozier and a steward of one of the lost vessels, who died near Southampton Island while endeavoring to make their way to that place, in the belief that they would there find a whaler which would carry them home. Dr. Hall is confident of the identity of Captain Crozier with one of the men described to have perished, and has in his possession several articles that belonged to him. The fate of the two unfortunate men, who, after eighteen years' wandering through the Arctic wastes, had so nearly reached a place within reach of civilized man, forms one of the saddest chapters in the melancholy and mysterious story of the lost expedition.

From the New York Mail.

TYPES--WHAT MACHINERY CAN DO.

Type-setting by machinery has been a long-wished for and anxiously expected development of the printing business, toward which men have been working for forty years. It will surprise many to learn that there have been sixty patents granted for this purpose, thirty-five of these being in Old England, where William Church, the pioneer in this movement, obtained his first patent in 1822. Our Yankees have, however, as usual, taken off the prize. The only type-setting machines actually in use are the four of Mitchell's patents used in Trow's establishment, and one of later invention at John A. Gray & Green's. The former, however, is a very crude arrangement, the type being arranged in vertical piles and dropped on movable tapes by the pressing of the proper key. The key-board is like that of a piano, minus the black notes, and the rest of the machine gives the appearance of a horizontal harp. The *Continental Monthly* was set up entirely by these machines—whether its death was owing to this or not we cannot say.

FELT'S MACHINE.

The credit of this machine, however, belongs to Brooklyn. One of the best known mechanical type-setters is that of Mr. Felt, of Salem, Massachusetts. He worked long and faithfully at his self-imposed task, and obtained his first patent in 1854. His machine was eight feet high, and fearfully complicated—it attempted, however, to "set," justify, and distribute. The type-setter has, we believe, been abandoned, and Mr. Felt is now at work upon a justifier to complete the work of the Alden machine.

THE ALDEN TYPE-SETTER.

This was first devised by Timothy Alden, an immigrant from Massachusetts, in 1840. He had a little workshop in this city—we think in the old Harlem depot—where he planned and worked till 1857, when the Alden machine was patented. He had so devoted himself to his idea, that it finally got the better of him, wore him out, and in 1859, two years after his success, killed him. A nephew of his, however, Mr. Henry W. Alden, took up the matter and formed a company, which still exists. Mr. Chas. F. Livermore, is the president; Mr. Josiah Low, the vice-president; Andrew V Stout, treasurer; and Mr. Alden, treasurer. Since Mr. Timothy Alden's death, many mechanical and most important improvements have been made by Mr. J. T. Slingerland, who has brought it to its present state.

WHAT THE MACHINE IS.

The present machine, one of which is on exhibition at the manufactory of the company on Tompkins Square, is entirely horizontal in plan and presents the appearance of a table about three feet high. The compositor sits at a cylinder key-board, on which four rows of keys are arranged vertically. These communicate directly with eight rods, and by means of "permutation," every type is corresponded to by a different combination of some of these rods. Thus one letter-key pushes the seventh and eighth, another only the fifth, another the first, third, fourth, and seventh, and so on. These rods act on the revolving wheel at the back of the machine, which is armed with one hundred (vertical) rows of eight movable pins each. One row of the pins is pushed out to correspond with the communication of the rods at each touch on the key-board. Around this wheel, in a three-quarter circle of six feet diameter, are rows of type arranged in radii of the circle, under each of which is a key corresponding to the permutation of the pins for that letter. When a certain letter is called for on the pins, they strike this key and the letter is pushed out from its channel and taken up in its proper order by little fingers on the revolving wheel, and with a long row of its fellows is pushed out just behind the key-cylinder at the front.

THE OLD AND THE NEW.

In the old machine, the type had to be made of thirteen different thicknesses and especially for the machine. By this machine the ordinary type are used, after having been nicked on one side to correspond with the respective combinations on the pins. The old machine contained merely in its key-board over thirteen hundred pieces; this key-cylinder contains one hundred and thirty, while the whole apparatus at present contains only twelve hundred pieces, all told. The machine, with one person at the keys and one to justify—that is, arrange the words in lines of the proper length and put the necessary space between—runs off four thousand ems an hour, meanwhile distributing as much. This is the work of five ordinary compositors.

DISTRIBUTING.

The distributing process is almost exactly the reverse of the composing, but is altogether automatic. The "dead" matter is placed on a bed to the right of the key cylinder, and is taken up line by line as each is exhausted. The types are taken up by distributing transits in the revolving wheel, and, by means of the nicks, registered as before, transferred to the channel whence each started. Extra spaces, etc., placed in during justification, are tipped out at the end of the channels. All unnicked type are thrown out into a separate box, italics into another.

FURTHER IMPROVEMENTS.

A full font of type, accents, italics, small caps and all, contains 355 pieces. Of these the machine sets up only the ordinary small letters, and full capitals, the figures and ordinary signs. It is, therefore, scarcely available for newspaper work, but will probably some day be generally used for books, where there is plenty of time and a good deal of uniformity. Several books have, indeed, lately been reprinted thus for the Messrs. Appleton. The machines at present cost $2 500 each. The great objections are first, their expense; secondly, their complication; thirdly, the difficulty of supplying fresh type when one letter is especially called for. Mr. Slingerland, who keeps up a wonderful thinking about these things all the time, proposes to obviate these difficulties by building two machines, one for composing and one for distributing, which will be much simpler and will cost but $1,200 for the pair.

A STEREOTYPE MACHINE.

A crude machine, which, however, contains the germ of a process by which most of our printing will some day be done, was exhibited a year or two ago in Grand street by a man named Nelson. An apparatus on the same principle was also exhibited by some one at the Paris Exposition. In this but one type of each sort is used, which is arranged at the end of a key lever, and imprints itself in the proper place on a bed of clay moving automatically. This, when completed, is served as the ordinary plaster casts for stereotyping—the liquid metal is poured in, and in a few moments we have complete stereotype plates. The work turned out was not very good, but as the idea has not yet been worked up, and the machine will be cheap, simple, and quick, we think there is considerable ground for our prophecy above.

THE STORY OF A STRIKE.

The only instance, however, in which machinery has been used on a newspaper for composition was in the case of the *Tribune*, which had an Alden machine in use for a short time some years ago. The *World* has lately tried reducing its composing expenses by the use of female labor, but without much success. Sometime since, the Brooklyn papers, the *Eagle* and *Union*, refused to concede the rise demanded by their compositors, from 37 to 40 cents per thousand. A week's notice was given, after which the compositors struck. The *Eagle*, being of the same politics, sent over to borrow matter from the *World*, and immediately after issuing would send their miscellany across the street to the *Union*, and thus both papers, though with great difficulty, were published.

GIRL COMPOSITORS.

The *World* compositors didn't relish working against their Brooklyn brethren, and after due notice struck. At that time this journal was set up in great part by females, a couple of dozen being employed. They were payed only ten cents a thousand less than the males—that is, forty cents They, however, found difficulty in reading manuscript, and even with reprint matter earned on the average but six to seven dollars a week, where men averaged at least twenty dollars. There were but two or three good compositresses among them, and the experiment has been given up as regards newspaper work. They, however, prevent the success of strikes, and for this reason the Typographical Union proposes to admit them and to demand for them exactly the same price as for men.

ABOUT SLUGS.

But to return to our composing-room. Each compositor is distinguished, not by his name, which is dropped (except on pay day) at the outer door of the office, but by a number or letter. Mr. Brown is no longer Mr Brown, but "Slug A" or "Slug 1," Mr. Jones is "Slug B," and so on. Each morning paper office has, beside several assistant foremen, a day foreman, a night foreman, and a foreman *par excellence*. The foreman on duty receives each article as it comes from the editorial rooms, and cuts it into "takes," portions which occupy a compositor for about half an hour. The article is designated by a letter, and each "take" is numbered according to its order and given out to the compositor in the order in which they finished the last job. He puts his "slug," a piece of heavy type metal, which prints his number or letter, at the top of his "stick," and goes to work. Thus sometimes fifty compositors may be at work at the same time upon one article, or there may be a dozen articles running through the office at once.

CORRECTING PROOFS.

When a compositor has finished his "take," he puts it on the "galley" (which is merely a long, brass lined, flat receptacle, a little wider than the column) in its proper place. Another man then "pulls the galley" as soon as it is full, that is, takes a proof of the matter therein, which goes to the proof-readers. These read it by the sense, if it is not specially important, or compare it with the "copy," if it is an editorial or something of similar moment, and it then goes back to the galley man. According to the "four error" system in vogue at present, the first "slug" on the galley who has made the first error in his work is called to correct. He accordingly corrects not only his own work but continues until he comes to another set of four errors in one take, when that compositor is called—so on through the rest of the galley. Sometimes the standard is six errors, sometimes more allowance than this is made. A compositor is bound to correct his matter without other charge than the original price of composition, and this is where a skillful workman finds the advantage of making few mistakes.

"OFFICE CORRECTIONS."

After this correction a "revise"—that is, a second proof—is taken, and the "reviser" compares this with the corrected first proof. Our large morning dailies employ usually about half-a-dozen readers and one or two revisers. The editors also often correct their own matter. If they make any change from their original manuscript, these are designated "office corrections," and distinguished by a pencil line drawn entirely around them—"ringing" it is called—and for these the compositors are paid by time.

"MAKING UP."

The matter having been re-corrected the paper is "made up"—that is, the articles are arranged in their proper place and order in the "forms." This is done by one of the foremen, sometimes at his own discretion, sometimes by a written memorandum from the editorial rooms, sometimes under the personal supervision of an editor. The matter on the galleys is well dowsed with water to make it stick, a few lines of type are then carefully transferred, leads taken out or put in to hit the bottom of the column properly—leads, by the way, are the narrow strips of metal, placed between the rows of type, whence probably "leaders," which are usually so treated—dashes are properly sprinkled throughout, and finally, the page filled out, the matter is "locked up" by wedges and screws and is ready for the press.

Editorial Summary.

CAVEATS.—Whenever an inventor is engaged in working out a new improvement, and is fearful that some other party may get ahead of him in applying for a patent, it is desirable, under such circumstances, to file a caveat, which is good for one year, and during that time will operate to prevent the issue of a patent to other parties. The nature of a caveat is fully explained in our pamphlet which we mail free of charge.

THE "NEW YORK MERCANTILE JOURNAL."—This valuable paper appeared this week in a new form and dress, which gives ample evidence of a well-earned prosperity. It is one of the most valuable papers of its class, containing weekly market reports of nearly every commodity which is susceptible of quotation, beside much matter of solid information, of interest to business men. The names of first-class houses in every line of trade, which appear in its advertising columns, give assurance that its merits are appreciated.

PROF. ZENGER, of Prague, is exhibiting to the British Association an automatic telegraphic apparatus, by which he proposes to secure correctness in the telegraph signs by mechanical means, independently of the hand of the operator. No details of this machine have been yet given from which we can get an idea of it. It is simply announced that no change in the management of the Morse apparatus is required beyond the removal of the key and the substitution of the automatic apparatus.

TO CLEAN SILVER PLATE.—Fill a large saucepan with water; put into it one ounce of carbonate of potash and a quarter of a pound of whiting. Now put in all the spoons, forks, and small plate, and boil them for twenty minutes; after which take the saucepan off the fire and allow the liquor to become cold; then take each piece out and polish with soft leather. A soft brush must be used to clean the embossed and engraved parts.—*S. Piesse.*

MR. GEO. W. CHILDS, the energetic publisher of the *Philadelphia Ledger*, announces his intention to take a respite for a few months from the arduous duties of a publisher's life. Mr. Childs takes with him his family and sails for Europe this month. Mr. C. needs the rest, and with his merited reputation and genial qualities his arrival will be hailed with delight by many of our citizens sojourning abroad.

VELOCIPEDE WANTED.—We are having numerous inquiries for more information concerning the improved velocipede called for by the correspondent C. R. G., Paris, on page 212. In answer to all such we would state that we published all that was said on that subject in the letter. If any one wishes to see the original letter he can do so by calling at our office. We are not authorized to publish the writer's name.

IN looking over our large list of exchanges we are gratified to notice that the SCIENTIFIC AMERICAN supplies them with a liberal amount of matter; and it is especially gratifying to us that the proper credit is usually given. It is our rule to credit all selected matter when it is possible for us to do so, therefore it is easy for our cotemporaries to judge what should and should not be credited to the SCIENTIFIC AMERICAN.

IRON in its various forms holds the third place in the list of American manufactured productions. Clothing, boots and shoes, leather and skins, severally, come very near to iron.

SIXTEEN kinds of fossil horses have been found in North America, yet there were no horses here when this country was discovered.

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Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents

COMBINED SAWING, PLANING, TURNING, AND BORING WOOD MACHINE.—Thomas Smith, California, Mo —This invention is designed particularly for use in the carriage shop, and consists of a combination of parts by which all the various operations of sawing, planing, turning, and boring the material of which the wheels and other parts of carriages are constructed, can be performed by a single machine, thereby saving great expense, economizing room, and operating more conveniently than when several machines are employed.

"MARYLAND REFRIGERATOR."—Samuel Child, Baltimore, Md.—This improved refrigerator is so constructed that the meltings of the ice are retained in a position where they can be used to absorb the gases, vapors, or odorous matters that are given off from the viands, while the ice-cold water, as it becomes charged with these offensive matters, is passed out of the refrigerator without allowing entrance to the external air, and without permitting any air currents to pass in contact with the ice, either over or under it.

REVOLVING HORSE HAY RAKE.—John W. Acker, Copenhagen, N. Y.—This invention has for its object to improve the construction of the ordinary revolving hay rake, so as to make it more convenient and effective in operation.

GATE FASTENING.—M. B. Markham, Grass Lake, Mich.—This invention has for its object to furnish an improved gate fastening, which shall be so constructed and arranged that when the gate is swung shut, it will fasten itself; and which shall at the same time be cheap, simple in construction, and reliable in operation, holding the gate securely fastened.

PAPER PAILS, ETC.—Augustus Jennings and Isaac Jennings, Fairfield, Conn.— This invention has for its object to improve the construction of paper pails and other vessels, so as to make them more durable and stronger in construction, and more reliable in use.

CORN PLANTER.—Wm. B. Goodwin, Effingham, Ill.—This invention relates to improvements in corn planters, the object of which is to provide markers to show the rows of corn in both directions, and a spreader for spreading the grains of corn as they drop into the ground, and it consists of the arrangement of mechanism for accomplishing the same.

CULTIVATOR.—J. C. Stroud, Lockhart, Texas.—This invention has for its object to improve the construction of cultivators, especially with reference to the attachment and operation of the plow beams, so as to make a more convenient and effective machine.

COMBINED ROLLER, HARROW, AND MARKER.—Jacob Ginther, Mier, Ill.—This invention has for its object to furnish an improved combined roller, harrow, and marker, which shall be so constructed and arranged that the three devices may all be used together, or the roller alone, or the harrow alone, or the roller and harrow without the marker, or the harrow and marker without the roller, as may be desired.

LUBRICATOR.—John Harlin, New York city.—The object of this invention is to provide a lubricator with an ordinary plug or cock, in such manner that it can never leak. It consists in the application of packing at the large end of the plug, whereby the escape of any fluid, either oil or steam, is completely prevented.

LATHE CHUCK.—John R. Washburn, West Stafford, Conn.—This invention relates to a new device for adjusting and operating the jaws of that class of chucks which are provided with gear and scroll wheels, and the invention consists in attaching the operating pinion to the key, so that it will form part of the key and not of the chuck, as usual. Thereby the necessity of providing bearings for the pinion is overcome and the application of the key to any side of the chuck is rendered possible, by providing a series of apertures for the insertion of the key, through the sides of the chuck.

REVERSIBLE CHAIR.—Wm. H. Joeckel, New York city.—The object of this invention is to so construct railroad car and other chairs, that when the back is swung over to reverse the front of the seat, the seat itself will also slightly swing, so as to be lowest nearest the back. The invention consists in the application of two arms, one each side of the chair, for transmitting the requisite motion from the back to the seat, but not *vice versa*.

TOY GUN.—Fisher A. Spofford and Matthew G. Raffington, Columbus, Ohio.—The object of this invention is to so construct a toy gun that it can be readily discharged, even when provided with a strong spring. The invention consists in the formation of a downward enlargement of the barrel, near the breech end of the same, into which enlargement the front part of the plunger is fitted when the piece is cocked; the trigger has then only to raise the plunger out of the enlargement and to bring it in line with the bore of the barrel, thereby exposing it to the full action of the spring.

HAY KNIFE.—Charles A. Fisher, Geneseo, Ill.—This invention relates to the construction of a knife for cutting hay, but relating more particularly to the handle thereof and the manner of its connection with the shank of the knife.

TUMBLER STAND.—J. C. Wharton, Nashville, Tenn.—The object of this invention is to provide a stand for tumblers or other drinking vessels of similar character, and is designed as an adjunct to soda water fountains, or as an article of furniture in places where beverages and fluids are retailed.

FINGER RING.—W. H. Peckham, New York city.—This invention relates to a new finger ring, which is provided with a groove on the inner side, so that with an outer side of ordinary or suitable shape the ring will appear to be solid and heavy, while it will, in fact, be a light shell. By this method beautiful rings can be cheaply produced, and not so much metal will be wasted in their manufacture.

FISHING WITH SET NETS.—Thomas Cartwright, Davenport, Iowa.—This invention relates to a new and improved application of a fyke or set net, with a boat or vessel, whereby the fyke or net may be set and raised with the greatest facility in a tide way, and in localities where nets of this kind has not been hitherto used.

SELF-ACTING DAMPER.—George Tamkin, Newburg, N. Y.—This invention consists in the employment of a composite metallic rod within the stove pipe, in connection with the usual circular damper, and so arranged that the damper will be adjusted automatically by the vibration of the rod which vibration is due to the unequal expansion or dilatation of the two parts composing the rod.

SPLINT FOR SURGICAL USES.—H. D. Ballard, Findlay, Ohio.—This invention consists of a splint made in two parts, which are so joined together as to be adjustable in a longitudinal direction, and provided with springs arranged to have a constant tendency to extend the parts. The ends of the splint are provided with buckles to which adhesive straps may be buckled for fastening it to the bandages of a limb.

ELASTIC ROOFING.—Thomas E. Wood, Knoxville, Pa.—The nature of this invention relates to improvements in roofing, and consists in the construction of roofs of the compound which forms an elastic covering which will not be effected by the weather.

AXLES FOR CARRIAGES.—W. D. Bollinger, Cedar Rapids, Iowa.—This invention relates to improvements in axles for carriages, and has for its object to provide an arrangement whereby the wheels may be connected rapidly to the axle, and yet be independent of each other. It consists in producing a compound axle, having one part arranged to work within the other.

APPARATUS FOR JOINTING CIRCULAR SAWS.—Isaac France, Peru, Ind.—This invention consists of an attachment to be applied to the mandrel of the saw at one end, the other projecting beyond the cutting points of the teeth, parallel with the side of the saw, and supporting a slide, whereon a file is secured in such a manner that it may be fed up against the teeth to dress those projecting down to the line of the shortest ones.

PUMPING ENGINE.—George W. Perry, Shenandoah city, Pa.—This invention relates to improvements in engines used for raising water from mines, and especially designed to be applied to what is known as the "Cornish pumping engine," whereby many of the objections to that engine are obviated.

SHEARING DEVICE.—William S. Lane, Beaver Dam, N. Y.—This invention relates to a device to aid in the operation of shearing sheep, whereby that difficult performance is greatly facilitated, and consists in providing an elevated trough in which to secure the sheep, so constructed and arranged that the position of the trough may be changed by the foot of the operator.

HORSE SHOE —P. C. Johnson, and Edwin Froggott, Central city, Colorado Ter.—This invention relates to a new and improved mode of securing calks to horse shoes, whereby the former may be very readily applied to and detached from the latter, and a horse shoe always kept supplied with proper calks without the aid of a smith.

WHEEL FOR VEHICLE.—J. Blackburn Jones, Sparta, Ill.—This invention relates to a new and improved wheel for vehicles, and of that class which are made of iron and wood combined.

TANNING COMPOUND.—B. F. Gross, Trenton, Tenn.—This invention relates to an improvement in tanning leather, whereby the time usually consumed in the process is greatly lessened, and the expense of tanning otherwise reduced.

SPRING FOR WHEEL VEHICLES.—E. L. Gaylord, Terryville Conn.—This invention relates to a new and useful improvement in springs for wheel vehicles, and is designed to supersede what are generally known as "side springs."

STEAMBOAT PADDLE WHEELS.—James Granger, Zanesville, Ohio.—This invention consists in providing a traveling bridge for the chain to which the buckets are attached, which shall prevent the chain from sagging, and otherwise support and keep the wheel in place.

BALANCED SLIDE VALVE.—J.R. Hall, Salem, Ohio.—This invention consists in providing cylinders in the back of the valve, and fitting therein plungers, having recesses in the top opening to the face of steam chest having areas equal to the different parts of the valve exposed to an upward pressure, and openings to admit the line steam to them, and provided with packing joints to control the steam in passing to and from the said recesses.

MITER MACHINE.—James H. Estes, Boston, Mass.—The present invention relates to a tool or machine for the cutting of miters or angles in wood, which is so constructed as to be susceptible of adjustment for cutting or sawing the wood placed therein to any desired angle, with reference to its length or thickness, or both, at one and the same time; and in combination therewith, so constructed as to form a rest or bearing for a plane when used thereon, at and along with edges of the plane stock, beyond its cutter blade.

HARROW AND CULTIVATOR.—A. S. White, Malone, N. Y.—This invention relates to a new and improved drag or harrow which may also be used as a cultivator.

FOLDING CHAIR.—Claudius O. Collignon and Nicholas Collignon, Closter, N. J.—This invention relates to improvements in folding chairs, whereby they are made more durable and substantial than those heretofore known.

STUMP EXTRACTOR.—T. J. Booth, Jefferson Line, Pa.—The object of this invention is to provide a simple and powerful machine for extracting stumps.

DENTAL MODEL PLATE OR DIE.—Levi Stuck, Bryan, Ohio.—The object of this invention is to obtain a perfect dental model plate or die of metal, by casting the same in the plaster from the mouth impression.

DAVIT BLOCK AND HOOK.—N. M. Ray, Ellsworth, Me.—The object of this invention is to accomplish the unhooking of boat tackles without the necessity of a person getting into the boat, whereby the boat may be detached safely and expeditiously while the vessel is under headway, or when there is much sea on, without liability to fill or swamp.

ELEVATOR.—N. L. Milburn, St. Louis, Mo.—The object of this invention is to provide a simple and effective machine for elevating bricks and other building materials to the workmen on the scaffolding of buildings in course of erection. It consists, in general terms, of a pair of platforms attached to the ends of a chain or rope which passes over a drum or wide pulley mounted on a shaft at the top of a suitable frame work, together with other accessory mechanism.

AWNING.—Thomas G. Tyler, New York city.—The object of this invention is to provide an improved form of awning, which is portable, durable, and easily operated. It consists, in general terms, of a system of frames each of which is composed of a rectangular front slat or board affixed to two tapered side slats with points of the side slats of each frame pivoted to a common center. Each frame is successively smaller than the other so that they will pass one within the other, successively, when the apparatus is raised, thus bringing it in a small compass suitable for portability. It is provided with stay rods, halyards, and other devices perfecting the whole.

FOLDING CHAIR.—Adam Collignon, Closter, N. J.—This invention relates to chairs, which are made to fold up, for convenience in transportation and storage.

STEAM PUMPING ENGINE.—Robert Allison, Port Carbon, Pa.—The object of this invention is to overcome difficulties which have hitherto been experienced in the use of pumping engines for raising water from deep mines.

HORSE HAY FORK.—William D. Brooks, Bethany, Pa.—This invention relates to a new and improved device for elevating hay and grain, both for stacking and mowing the same in barns, which devices are commonly termed horse hay forks.

GUARD FOR CARPET-SWEEPING MACHINES.—Gilbert F. Taylor, New York city.—This invention consists in the application of a pad to the sweeping case, the pad being constructed and arranged in such a manner that it will effectually prevent the abrasion of furniture, and admit of being readily applied to and detached from the case.

STEAM BOILER.—Marshall Turley, Council Bluffs, Iowa.—This invention relates to improvements in boilers for generating steam, whereby the greatest amount of steam generating or fire surface is obtained, and danger from bursting or overpressure is avoided.

LOCK.—Christopher Read, Jersey City, N. J.—This invention relates to new and important improvements in door locks, and locks for other purposes, whereby they are made burglar-proof, and it consists in an arrangement of tumblers, slides, and cams, whereby the keyhole is closed by the operation of locking the door, thereby rendering it impossible to insert any other key or a burglar's tool for picking the lock.

VARIABLE CUT-OFF STEAM-VALVE GEAR.—George J. Roberts, Dayton, Ohio.—This invention consists in so operating the induction valves of a steam engine that the quantity of steam admitted into the cylinder shall depend upon the speed, and be made variable according to the power required.

CORPSE PRESERVER.—J. J. Reicherts, Delaware, Ohio.—This invention consists in so forming a case for the reception of dead bodies, before burial, that they may be preserved from decay for a reasonable length of time (a number of days), by lowering the temperature by the use of ice and in producing a circulation of air through the case.

STEAM GENERATOR.—Victor Langlois, Cherbourg Dock yard, France.—This invention relates to improvements in the construction of multi-tubular boilers and in tools for securing the tubes, also, a method of preventing incrustation.

MAGNETIC PRINTING TELEGRAPH.—Pierre Antonie Joseph Dujardin, Lille, France.—This invention relates to improvements in telegraphs for printing either letters or figures, at will and embodies two systems one of which is a modification of the other. In the first system, the type wheels fixed crosswise over one another rock on their common axes and are placed first one and the other opposite the paper strip, which always keeps the same direction. While in the second system the type wheels are parallel and stationary on their axis, the printing anvil alone being rocked and presenting the paper first opposite one type wheel, and the other.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. C., of N. Y.—The "rich orange hue" to light brass work is produced by cleansing with acids, and the use of a lacquer, many recipes for which may be found in previous numbers of the SCIENTIFIC AMERICAN.

F. P. S., of Ind., asks for the composition of the fulminate for needle guns. We think fulminating mercury is the principal ingredient. What other substances are used, except a paste for coherency, we cannot say. Perhaps some of our readers possess the secret.

H. J. E., of N. Y.—"Can you give me any information in regard to the best style of rollers for moving buildings?" Rollers of seasoned hard wood, oak, elm, or rock maple, from eight to twelve inches diameter and from four to six feet long.

W. P. B., of Wis.—"A. R. B., a machinist, claims that a boiler 8 feet diameter will carry the same pressure per square inch as one 4 ft. diameter of the same thickness of iron, other things being equal. I, a tanner, claim the contrary. Please decide." The common lap welded tubes used in steam boilers, of less than one eighth thickness of iron, will withstand a pressure of 600 lbs. to the square inch. Will a cylinder of the same thickness, but 6 feet diameter, bear this pressure? Any text book will teach A. R B. his error.

H. P., of Ohio.—"What is the best way of hanging a shop grindstone running in water all the time, or rather all the working hours? I have trued the stone by clamps—four bars with set screws at each end—on a square shaft, and also by 'shims' or wedges driven between the stone and shaft, and in both these ways have split the stone." In our experience we have met with the same mishap in using the set screw clamps. Our plan is to hang the stone on a square shaft and use split shingles (dry) as wedges for trueing the stone, and when true cut them off up to the edge of the stone, and then slip on flanges of cast iron with disks of leather between their faces and the stone. The surfaces of the leather disks should be coated with white lead and oil, very thick on the side toward the stone to fill up the interstices of its rough surface, and then the flanges screwed up snug by nuts on the shaft, which should be threaded for this purpose. This will prevent water from reaching the cedar wedges and swelling them, and the stone will remain in place on its shaft until used up.

J. P. J., of Mass., asks why all engine cylinders are not bored horizontally. He thinks it strange that some are bored upright. Cylinders of any large size should be bored in the position they are destined to occupy, because the weight of a cylinder when resting horizontally will tend to compress the top side and render the bore elliptical instead of circular. Small sized cylinders, 30, 24, or a less number of inches diameter, which have relatively thicker shells than larger ones, may be bored without reference to their use as horizontal or vertical engines. A cylinder 6 feet diameter, 1½ thick, will show a difference in diameter of 1½ inches when laid horizontally.

P. J. P. of R. I.—My "boss" objects to filing my lathe centers to finish them to a point. How can I otherwise do it?" Your case is like many others of those who have never learned hand tooling, a branch altogether too much neglected. Your boss is right. Practice hand tooling and with water you can finish even the point of the center without having recourse to a file. The use of a file for that purpose is evidence of a "botchy" workman.

S. M. D., of N. Y.— A recipe capable of doing all that you desire, would be much more valuable than the amount you propose to give for it.

Business and Personal.

The charge for insertion under this head is one dollar a line.

A second-hand air-pump, in good order, and admirably adapted for experimental purposes. Barrel 9 by 1¼ inches, plate 7 inches in diameter. Also, a bell glass receiver with cap and stop cock, will be sold cheap for cash. Address J. H. Edwards, postoffice box 773, New York city.

A draftsman of varied experience and excellent reference, desires a situation. Wm. R. Brooks, Edwardsburg, Mich.

F. H. C. Honneus, Bennettsville, Ind., wishes to obtain a machine for cutting staves from the round log.

Parties wishing a very cheap twist drill and straight groove cutter, address M. M. Burdick, 27 Richmond st., Providence, R. I. Rights for sale.

Wanted—some one to put through a first-class patent. For further information address H. S. S., Du Quoin, Ill.

Wanted—75-horse water power near poplar or spruce timber. Cheap power and low freights needed. H. D. M., box 265, New York city.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

For sharpening all kinds of woodsaws, beyond anything heretofore known, inclose 50c., and address E. Roth, New Oxford, Pa.

Machine for picking oakum wanted. Address, with particulars about cost, etc., W. H. S., box 773, New York postoffice.

Wanted—new or second-hand tools for making hubs, spokes, and fellies. Send description and price to Hurd & Bro., Urbana, Ohio.

The attention of manufacturers of hardware and of metal or or wooden small wares generally, is directed to the very superior enamel or finish given to such articles by the American Enamel Co., of Providence, R. I., which, for beauty of luster and durability, is unsurpassed. For an imitation of jet or vulcanite jewelry it is just the thing. Samples on wood may be seen at the office of Landers, Frary & Clark, 31 Beekman st., N. Y., or will be furnished on application to the Co. by mail.

Millstone-dressing diamond machine, simple, effective, and durable. Also, Glazier's diamonds, diamond drills, tools for mining, and other purposes. Send stamp for circular. J. Dickinson, 64 Nassau st., N.Y.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

For sale—the patent right, in Great Britain, for perforated saws. The manufacture of these saws is now firmly established in the United States, and they are rapidly taking the place of all other solid saws. Apply to J. E. Emerson, Trenton, N. J.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

Winans' anti-incrustation powder, 11 Wall st., N. Y. 20,000 references. No foaming. No injury. 12 years in use. Imitations plenty.

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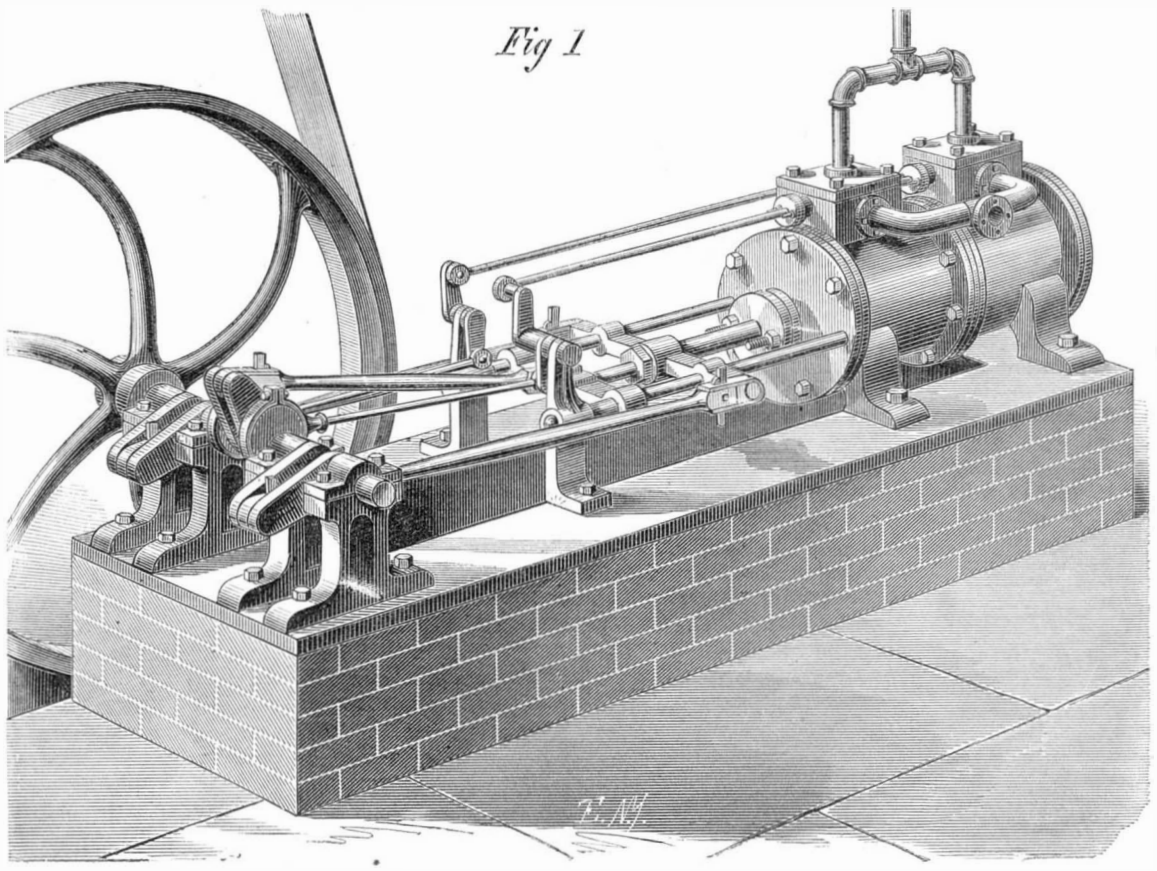
Improvement in Double Cylinder Engines.

Fig. 1 represents the above engine in a perspective view, and Fig. 2 a longitudinal vertical section of the cylinders of a working model. The object of the invention is "to produce a double-acting cylinder which will do the work of two separate cylinders, without being much more expensive than one single cylinder." The machine has a cylinder divided by a transverse partition, A, Fig. 2, into two cylinders of equal diameter and length. Preferably this combined cylinder is cast in two parts, bolted together and bored, when the gland or partition, A, is introduced and the whole secured, as seen in Fig. 1. Each cylinder has its own piston, that in B having a rod working through a guide and stuffing box on the partition, A, and through the hollow piston rod of the cylinder, C. This hollow rod may be cored out through the greater part of its length, if desired, leaving bearing surfaces at each end. The crosshead to which the tubular piston is attached is furnished with a bearing box to receive and guide the rod of the piston in the cylinder, B. The crossheads of the piston rods run on slide bars connected at one end with the front cylinder head, and at the other with uprights secured to the bed, which also support the rock shafts connecting the eccentrics and valves. Both the piston crossheads are connected by bars to cranks on two shafts in line with each other, made one by the central crank, which with the outside cranks stand at the position of ninety degrees, so that while one crank is in the position known as the dead center the others are at right angles to the line of motion of the piston, thus neutralizing the dead center point and obviating the necessity of a fly wheel. This relative position of the pistons is seen plainly in Fig. 2.



FISK'S DOUBLE PISTON AND CYLINDER STEAM ENGINE.

Each cylinder has its own steam chest and independent pipe from the boiler, so that steam of the same pressure and temperature is used in one cylinder as in the other. The action of the valve rods, by eccentrics, as usual, and the general construction of the engine are perfectly apparent from the engravings, as is also the design of the inventor. He claims that in "this engine there is double power compared with a single piston engine of the same length of stroke and diameter of cylinder, inasmuch as the steam has full power upon two pistons instead of one, and the greater length of stroke in the single piston engine is compensated for by the advantage of placing the cranks at right angles, one crank overcoming the dead point of the other. There is also a great gain in weight and space as compared with the single piston engine, as the weight of the cumbrous fly wheel and its attachments may be dispensed with."

Further information may be obtained by addressing the inventor, E. A. Fisk, New Orleans, La.

Patent pending through the Scientific American Patent Agency.

Carbonic Acid of the Atmosphere.

The atmosphere contains a small proportion of carbonic acid gas. This quantity is variable, differing from three to nearly seven parts in 10,000. Assuming then, the mean of these—namely, that there are five parts of that gas in 10,000 of air, it will be interesting to show the weight of it, and perhaps even more so of that of the carbon contained therein, thus so singularly distributed about us. It is found that one cubic yard of carbonic acid gas weighs 3 lb. 5 oz. 8 dr.; consequently, one cubic mile weighs more than 8,139,011 tuns; since there are about 977 cubic miles of this gas in the whole atmosphere, its total weight slightly exceeds 7,454,285,092 tuns. The quantity of actual carbon is of course less, because carbonic acid gas consists of carbon nearly 27¼, and oxygen 72¾ in every 100 parts; or, in other words, a cubic yard of carbonic acid gas contains by weight about 14½ oz. of carbon and 2 lb. 6¾ oz. of oxygen. A cubic mile of it contains rather more than 3,898,292 tuns of this element. The 977 cubic miles in our atmosphere contains the stupendous amount of 2,155,834,277 tuns. If it were possible to render this carbon available as a fuel, using it at the rate we use our coal (105,000,000 tuns annually), it would last for a period of more than twenty years.—*C. H. Piesse.*

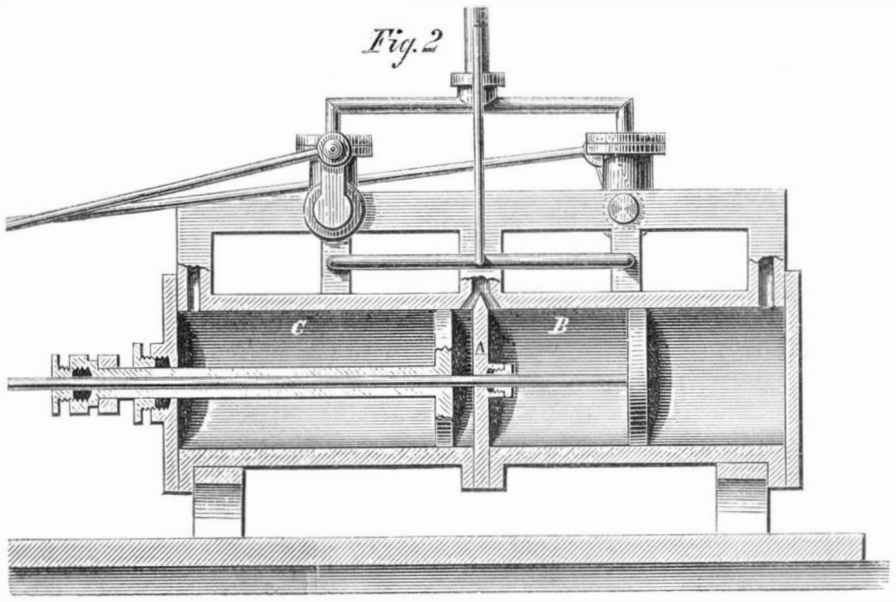
An Achievement in Dentistry.

The editor of the *Bainbridge Argus* gives an interesting account of restoration of speech by means of an artificial palate, made for him by Professor Kingsley of New York College of Dentistry. He says:

"All persons acquainted with us are aware of the loss of speech which we sustained in early life by the destruction of our palate, caused by scrofula. This almost totally disqualified us for any business, calling us beyond the circle of our immediate friends and associates. A stranger could rarely understand a word we might say. We thank God that we are enabled to state to our friends that by means of an artificial palate, put in our mouth by Dr. Kingsley, our speech has been entirely restored, and we are now, for the first time during the last twenty-eight years, qualified to converse freely with any one without the slightest inconvenience or embarrassment, and without being misapprehended or misunderstood in any word or sentence we may utter. It has proven a very great relief to us, so much so that our past life seems to have been an uninterrupted blank."

A Gigantic Balloon.---A New Aeronautical Experiment in England.

A London paper says: "Over the Ashburnham grounds, immediately to the west of Cremorne Gardens, now floats a balloon of unparalleled dimensions, and which, from the peculiarity of its accompanying machinery, seems likely to acquire a remarkable place in the history of aeronautical science. It is nearly spherical in shape; it is ninety feet in diameter; it is capable of receiving 353,000 cubic feet of gas; and it has a lifting power of eleven tuns. Its magnitude will perhaps be brought more distinctly home to the imaginations of our readers by the statement that the receptive capacity of the balloon in which Mr. Glaisher made his important experiments, and which was, we believe, the largest one hitherto constructed in England, held only 93,060 cubic feet of gas, or about one-fourth of the quantity for which the new aerial monster can afford space. But the use to which this immense power may be applied is perhaps more remarkable and more likely to lead to valuable as well as interesting results than the power itself. Balloons, from their erratic and unmanageable propensities, have hitherto been little better than huge and costly toys. The 'Captive' balloon is placed, in one important respect, under human control, through its connection with the solid earth by means of a cable, just as a boy's kite is held by a string; and to this circumstance, as will be easily understood, it owes its name. This cable is worked by steam from a drum twenty-one feet long and seven feet in diameter, and passes underground to the balloon. Its weight is two and a half tuns, and its length two thousand feet.



"The weight of the balloon, with its car, ropes, and netting, is three and a half tuns, and this, with the cable, gives a total dead weight of six tuns, so that the available carrying power is five tuns, which is about two tuns more than would usually be required to lift thirty persons, the number the car is constructed to accommodate. The gas which is to inflate the vast machine, and which is pure hydrogen, requires for its manufacture some two hundred thousand pounds of sulphuric acid and one hundred and ten thousand pounds of iron filings have to be consumed. So costly and so delicate a work necessarily required some external protection, and an immense circular screen, formed of boards and canvas, shuts out the public from the space within which the balloon rests. The balloon, with its machinery, is French property, and has been entirely devised, and is almost exclusively worked, by Frenchmen. It offers a proof, too, of the enterprise as well as of the skill of our brilliant and ingenious neighbors. It has, we have been informed, involved from first to last an outlay of £28,000; and it is now proposed that some return should be obtained for this investment by charging one shilling to each visitor within the inclosure, and one pound to the aeronauts who ascend in the apparently safe and commodious car.

"Some experimental trips were made with the balloon on Thursday afternoon. In the first of these the ascent took place with mere ballast; in the second Mr. Godard, son of the celebrated French aeronaut, and M. Yon, who seems to have a large share in the management of the whole undertaking, were the only occupants in the car; in the third thirty persons, including two French ladies and a boy, filled the ascending vehicle, and after having attained in it to an elevation of nearly two thousand feet—the total length of the cable—returned from their aerial voyage with perfect ease and safety, and evidently much gratified with the novel and striking glimpse of London and its environs which, in spite of the warm haze obscuring the atmosphere, they were thus enabled to obtain. Those private or experimental trips were to have been renewed yesterday, and the show was to have been thrown open to the public to-day; but it was found that a rather considerable escape of gas had taken place; and in the attempt yesterday afternoon to remedy this defect an accident took place which may not improbably have the effect of delaying the intended exhibition for several days.

"A gasometer was constructed for the purpose of storing a supply of hydrogen to meet the inevitable waste which will be constantly occurring. A pit or well had, of course, to be dug under this gasometer; and in order to pump the water into the pit one of Merryweather's steam engines was being employed in immediate proximity to the spot on which were standing two rows of barrels in which the gas is generated. The engine was not engaged many minutes in this operation when the sparks from its chimney slightly set fire to some bags filled with iron; it was then stopped for a few moments; but its working having, in spite of the warning thus afforded, been soon renewed, the sparks were next carried to the retorts, causing sixteen of them to explode in rapid succession, and creating a scene of considerable excitement among the whole party filling the grounds. The barrel-heads and the zinc pipes by which they were connected with the gasometer were instantly blown away, and many of the fragments were driven over the lofty screen surrounding the balloon. One of the workmen was struck by a piece of this wood, and was slightly cut in the face, but no other damage, fortunately, was inflicted, and the accident might, certainly, under more unfavorable circumstances, have been attended with far more distressing consequences. As it was, it may render it impossible to recommence the ascent for a few days, but it cannot interfere with the ultimate success of the undertaking in which the constructors of this great balloon have engaged."

French Gas Stoves.

A correspondent calls our attention to an invention recently imported from France. It is a gas stove so constructed that when the gas is lighted, the cheerful appearance of a grate full of live coals, or of burning wood, is presented. We saw this stove on our recent visit to Europe, and it is a very pretty device. We believe, however, that the use of gas for heating purposes, unless special provision is made for the escape of the gases of combustion is injurious to health, except in apartments very thoroughly ventilated.

During the recent earthquake in Peru no the least horrible detail was the resurection of 500 mummies.

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NEW YORK, WEDNESDAY, OCTOBER 14, 1868.

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NEW AND IMPORTANT PATENT OFFICE RULE.

Commissioner Foote, in his firm purpose to break up certain practices in vogue in the Patent Office, has promulgated a very stringent and important rule, which ought to be understood by all inventors who intend to apply for Letters Patent.

It has hitherto been the custom of the Office to permit applicants, or their attorneys, to withdraw papers either before or after a rejection, for the purpose of making amendments. Hereafter this practice will not be allowed. Papers once filed must remain in the Office, and are not to be inspected for any purpose whatsoever, either by the applicant or his attorney.

The rigid enforcement of this rule renders it doubly important that specifications and drawings should be carefully prepared, in the first instance, by experienced and competent attorneys, and not by those who have little or no knowledge of the rules and practices of the Patent Office.

We admit that the new rule will operate somewhat severely upon such inventors as do not feel able to employ an attorney, yet we doubt not Commissioner Foote has had good reasons for promulgating the rule.

OUR 'GREASY MECHANICS"—WHO AND WHAT ARE THEY?

It is quite fashionable to talk from the lecturer's desk, and to write from the editor's table platitudes about the "dignity of labor," but in spite of these, perhaps well meant endeavors, the occupation of the mechanic, if not himself personally, is not yet popular. As laziness and aversion to merely utilitarian work appears to be innate (*vide* the savages in uncivilized countries and their countertypes at home), it would be too much to expect that labor, either in itself, or for its benefit to the community, would be sought after, especially when the labor comprehended dirt—soiled hands, and faces, and clothes, and general unpresentability—notwithstanding the fact that greasy mechanics can make as good an appearance, when washed and dressed, in the church, the social party, and the ball-room as those whose have never been soiled with

"The honorable grime of labor,"

It may be unpleasant to grasp the soiled hand of the mechanic at work, but water is plenty and soap is cheap, and the trouble of washing is amply paid by the consciousness of having shaken hands with one whose occupation is an honor, and its result a public benefit. For ourself, we always felt a personal pride in our standing among practical mechanics, and now feel a sort of masonic union with our former *confreres.*

Dirt is unpleasant to persons of even ordinary sensibilities. If "cleanliness is next to godliness," it is a virtue more generally admitted and practiced, at least outwardly, than others of a more saving character. This is well; but there *is* dirt that brings no dishonor on the wearer, the necessary dirt of labor. Of this no workman need be ashamed; it is not the badge of servitude, but the proof of independence. The filth of vice, the soil of idleness is disgusting, offensive to the beholder, and disgraceful to the wearer. It should be shunned as the pestilence.

Why mechanical employments, or rather the work of the mechanic should be considered, in any degree, low or degrading, it is hard to conceive. The antipathy has neither reason, fact, nor the exercise of taste to sustain it. Many other employments are as laborious, as purely mechanical, as monotonous, and some as soiling and indurating to the hands as that of the mechanic, yet they do not share in the disgrace some try to attach to the work of a mechanical trade. There is a proud gratification to the properly constituted mind in producing, by the exercise of the judgment and the acquired skill of the hands, some thing of use and beauty from inert and shapeless matter. Every mechanic has felt it as he has looked upon the product of his labor, the addition he has made, or aided in making, to the appliances of human needs, comforts, or desires.

Who are these greasy mechanics? They are the pathmakers of the nations, the pioneers of progress, the brain, muscle, and nerve of the country, the men who build up and sustain communities, who conquer nature and make her the servant of art. Such honorable names as Watt, Bramah, Fulton, Evans, Whitney, Blanchard, and Stephenson shed greater luster on their generation than those of the soldiers and politicians of their day. Who are among the most prominent and useful men in the country at present? Mechanics—practical workmen, who, if not now day workers, yet have previously served their novitiate at a trade and wrought with their hands. To mention but a few of those in our principal cities and towns who occupy enviable positions, but who are practical and greasy mechanics: in Philadelphia, we have Sellers, Jenks; in Providence, Corliss, Brown; in Taunton, Mason; in Worcester, Washburn; in Boston, Adams; in Hartford, Woodruff, Pratt, Whitney, Stannard; in New York, Hoe, Copeland, Smith, Bacon, and others, all practical mechanics, shedding honor on their vocation and ennobling labor. To this brief list might be added hundreds of living exemplifications of the honorable character of the mechanic's work, without mentioning a single name of those whose inventions, apart from their mechanical skill, have made their fame and fortune.

Can a business that is the chosen employment of such men as these be degrading or disgraceful? Can any other show a better array of talent, character, standing, or number in its ranks nobler men? We think not; and yet parents, even fathers who are themselves mechanics, hesitate about apprenticing their sons to a business than which there is none more honorable. Some exceptions there are. A prominent engineer, the other day, in conversation, stated that he had accumulated enough to set up his sons in business, and enable them to start from a higher point than he did, "yet," said he, "I am giving them the advantages of a practical knowledge of the machinist's trade, to which I hope they will stick, as I have, through life."

The late Col. Colt was himself a practical mechanic. By his will he left to his nephew an immense fortune. At the time of Col. Colt's death that nephew was learning his trade of machinist in his uncle's shop, working diligently, in his dirty overalls, day by day, subject to the same rules as other apprentices. On his uncle's death he became a millionaire; but, choosing a guardian to manage his property, he continued at his labor, and faithfully served his apprenticeship. Now, as he walks the rooms of his fine house, or drives his handsome team, he has the consciousness that if his riches "take to themselves wings and fly away," he is furnished with the means of getting an honest livelihood, and may make a fortune for himself. He *was* a greasy mechanic, and is not ashamed of it; and not afraid to "face the music" again.

Labor and its accompanying dirt are neither dishonorable nor degrading; laziness and its almost necessary vices are disgusting and destroying. Dirty hands and a sense of independence are to be preferred to kid gloves and a consciousness of being a mere drone in the human hive.

STRENGTH IN BUILDINGS AND ITS APPEARANCE.

The solidity, in appearance, of buildings, which seems to have been the governing idea of the ancient Egyptians, as shown in the architectural remains in that crude land of civilization, has few copies in this country; the most noticeable instance we know is the Tombs, of New York city. Although we would deprecate the construction of public or private buildings on an Egyptian model, where appearance of solidity gives satisfaction to the eye, and the appearance and fact may combine, and prefer, for our climate, with its clear skies and genial sun, an open, inviting style of architecture, we think that while the consideration of proportions of strength in the parts and materials of buildings may properly be, and sometimes is entertained, the eye is not gratified by the general style of our present city structures.

Naturally a building should appear to grow out of the solid ground, or be a part of that which we, fortunate dwellers in a region uncursed by earthquakes, consider solid; and a stone, brick, or iron structure elevated on poles, whether of wood or iron, does not accord with taste, nor seem to meet the "eternal fitness of things."

We have made the relative strength of materials, their resistance to strain longitudinally, transversely, and directly as a support, our study more or less for years, as it has been our business to write upon these subjects; but we share the natural antipathy of taste and the natural instinct of danger when we pass buildings whose lower stories consist merely of a few pipe stems of iron sustaining tons of stone or brick above them. It is not enough to say that these iron stems (they can hardly be called columns) *do* sustain the load imposed upon them; for the painful idea is impressed upon us, as we walk the streets, that it would be as well to copy the example of the priest and Levite, and "pass by on the other side." We know, and every sensible person knows, that if a slight sinking of the substructure should occur, even if only an inch or two, the whole immense superstructure would come tumbling down; and no foundation is so secure that pipe stem stays can provide against such a possible accident. That the heaviest foundation may be moved by what might be, at first sight, considered slight and inadequate means was shown a few years ago in a neighboring city, where a building of large proportions was erected. The foundations of the walls were sunk deeply below the surface of the street, and the walls made of unusually heavy stone. The soil was a tenacious clay, and the owner of the property thought to compact the loose soil or clay on the outside of the walls by a plentiful supply of water from a hose. The result was a moving of the foundation stones, notwithstanding the immense weight of the superincumbent walls, to such an extent that the building would have been a wreck, but for the style of roof, which was self-supporting and trussed, and thus held the side walls in place. Cross walls of heavy stone in the sub-basement proved necessary to prevent a catastrophe.

That requisite strength of a building can be secured with apparently light supports in the lower story, we will not deny. Slight iron columns will support an immense load, apparently entirely disproportioned to their diameter; but to go no further back than the Pemberton Mill affair in Lawrence, Mass., in 1860, we have not unfrequent accounts of the destruction of buildings because of insufficient support to the walls. But let this be as it may, it is distasteful to the eye and productive of a natural fear to prop up three or four stories of heavy stone or brick by a few slight stems of iron, or suspend them by a cast iron arch above the heads of passers-by. Two columns of ten or twelve inches diameter, having the appearance as well as the fact of solidity, would not detract much from the light of a store front, and they would give a satisfaction to the eye, and a sense of security to the mind, that the columnar pipe stems, or the suspended arches so much in vogue fail to impart. Something is due to the innate and instinctive tastes of human nature, and not everything to the hazardous experimentings of the engineer or builder. The spider's web, although one of the strongest structures in existence when amount of material and actual service are considered, does not have an appearance of strength, and travelers over the Niagara suspension bridge feel they have performed a feat they would not plume themselves upon if crossing a substantial stone structure, or such a bridge as that over the Menai Straits. In building, as in other matters, appearance as well as safety is an element worthy of consideration by our builders.

TACT---WHAT IS IT?

What is tact? What is this peculiar qualification which one possesses and another does not? which enables one to avoid disagreeable issues that others apparently quite as keen sighted, quite as well informed, quite as experienced are unable to shun?

All concede it to be an element of success. We often hear it said in commendation of some eminent man, that "he is a man of great tact," that "he has the tact to manage men," that he has "a superior tact for business," and so forth. If necessary to success in life, how can it be obtained? Before the latter question can be answered intelligently, we must know what it is we seek.

The primary meaning of the word tact is touch—feeling. The figurative meaning which has been attached to the word is difficult to accurately define. It has been defined as perception, peculiar skill, or faculty, discernment; but neither of these definitions is complete or satisfactory. Thus, when we say "he had sufficient tact to withdraw," we do not mean that he had skill, or discernment, or perception, sufficient to prompt him to withdraw; there is some thing more subtle involved than these definitions express. There is nothing so good as the primary meaning of the word, touch—feeling. Conceive the mind to be able to touch, to feel other minds, and you have got it exactly. The mind has many subtle modes of expression. An elevated eyebrow, a puzzled look, a a modulation in the voice, an impatient gesture, or a quiver of the lip, reveal hidden feelings, oftentimes against the will. Tact enables its possesser to immediately recognize these indications, and to shape his conduct accordingly.

In its highest perfection it is a rare quality. There are men who have sufficient force of character to thrust themselves into prominence without it, but they are few, and generally more feared than loved. If placed in situations of command, discontent and demoralization are almost certain to arise among those who submit to their rule, marked, as it is sure to be, by total disregard of the finer feelings of their subordinates.

The want of tact is the chief characteristic of the numerous family of bores; the men who call upon you to chat when your business is most pressing; who come into your shop and misplace your tools, who interrupt you when you are holding a confidential conversation; look over your shoulder when you chance to be writing; enter your private apartments without knocking; are always just where they are not wanted, and doing that which is disagreeable. These people are not, generally, intentionally offensive. They mostly mean well enough, but they are mental pachydermata, who can feel nothing but blows. A hint is thrown away upon them, and the only alternative, in dealing with them, is the kick.

Tact is born of sensibility—it is sensibility. To some it seems a natural gift, but it can be cultivated by all. The habit of observing carefully the countenances, the manners, and the language of men, the study of character, and a general acquaintance with human nature, will soon impart a knowledge of the secret springs of emotion, which, if touched at all, must be touched with wise and delicate skill.

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THE SUGAR BUSINESS IN CUBA.

From a correspondent in Havana, Cuba, E. K. Dod, we have received a long communication relating his experiences on sugar estates on the "ever faithful Isle," and asking for improvements in the business of harvesting the cane crop, which he thinks may be made by Yankee ingenuity. He says, in brief: "Our situation here is critical indeed. I see no chance of improvement in our sugar interests. Our planters seem determined to twist the ropes for their own necks, for the only cry is for more hands. It seems impossible for them to see that more hands is the cause of their present lamentable condition. The rapid increase of the beet sugar interest in France and other parts of Europe, together with our own crops, has so much exceeded in supply the demand that prices have fallen really below the absolute cost of production in this island and most of the others. It is well known that in France the cost of manufacture has been reduced in a greater ratio than the fall in price, and the business is profitable, while here the cost of production and manufacture is now more than it was in 1830, as negroes have nearly tripled in value. I do not think there is an estate on the island that pays current expenses. The amount of depreciation of lands, buildings, etc., leaves but about $150 per year for each negro; a sum not sufficient to cover the interest on their cost, deaths, and yearly depreciation, and yet the cry is, more hands."

The writer then goes on to describe the method of working sugar estates in Cuba, and shows that the use of a large number of hands and an adherence to old styles of work, are working a rapid deterioration in the value of lands and a diminution in the amount of products. The gist of his communication is that there is an opening and a necessity for the introduction of Yankee invention, brain, and personal supervision, to make Cuba what she ought to be—the garden of the Antilles and the great sugar producer of the world. He believes, also, that the beet root culture and the sugar manufacture from this source in the States, aided by the inventive talent of our mechanics, would soon render us independent of our Cuban supply.

PRESERVATION OF WOOD---PREVENTION OF DECAY.

On page 213, current volume, Scientific American, we copied the claim and description of Mr. Theodore W. Heinemann's patented process for preserving wood, applicable to all uses to which wood is applied, whether to be submitted to the action of the elements, as in ship building, houses, railroad ties and sleepers, fence posts, etc., or for indoor work, furniture, ornaments, and similar purposes. We are convinced that his method is really valuable and practicable. He expels the moisture—the prolific source of decay—destroys, or entirely changes the character of the nitrogenous or albuminous principles, and charges the pores of the wood with resin to such an extent as to render it really indestructible. It is well known that the preservation of Egyptian mummies for 3,000 or 4,000 years is due to the resinous quality of the gums and drugs used in embalming and that our most durable timber is that which contains this substance in the largest quantity and greatest purity.

Mr Heinemann's process also greatly improves the appearance of the woods submitted to it when used for ornamentation, darkening their tints, bringing out the peculiarities of structure, and making them susceptible of a high polish. Specimens may be examined at the office of the American Wood Preserving Company, 42 Broadway, New York city. See advertisement.

Organisms at the Bottom of the Atlantic.

Professor Huxley read a paper on some organisms which live at the bottom of the North Atlantic, in depths of 6,000ft. to 15,000ft. He said he had no doubt they were all acquainted with the subject of the Atlantic cable, which lay over 1,700 miles of sea bottom extending from the west coast of Ireland to Newfoundland. In 1857 a plan for laying that cable was first taking a thoroughly practical shape. Our Government had at that time been moved by representations made to them to have the sea bottom throughout that extent carefully examined, for the purpose of finding out whether there were any impediments to the safe lodgment of the cable at the bottom of the sea. Very various opinions were held on the subject, and many persons maintained that there were great rocks which would catch or cut the cable. The Admiralty despatched the "Bulldog" steam vessel, under the command of Captain Dayman, who was supplied with an ingenious apparatus, by means of which larger or smaller portions of the sea bottom could be brought bodily up from any depth at which soundings could be made. Captain Dayman made his soundings, and brought back his specimens of the sea bottom, and the Admiralty sent the whole of the soundings to him (Professor Huxley) for examination. They were extremely interesting, as they for the first time supplied the means of ascertaining what was the precise nature of the mud which covered the bottom of the sea. He should only speak of the soundings brought from a depth of from 1,000 to 2,400 or 2,500 fathoms or from 6,000ft. to 15,000ft. The depth of the Atlantic was such, that in the deepest part of it, if Mont Blanc was sunk, the top would be covered, and he had specimens of the bottom from that depth. It became his business to report on these soundings, and report of their nature; and he stated in his report that the deposits consisted of minute round bodies, to all appearance consisting of several concretic layers surrounding a clear center. As these bodies were rapidly dissolved by dilute acids he thought at that time that they could not be organic. That, however, he found, on more minute and careful investigation, to be an imperfect statement of the facts of the case. The largest of them was the 16-100th of an inch in diameter, and he had not examined them at first with a sufficient power.

Three or four years afterward, Dr. Warwick printed his "Notes on the Existence of Organic Bodies at Great Depths in the Sea." He discovered what he called cocospheres, which he thought looked extremely like as if they were made up of a number of what he (Professor Huxley) had called cocolites, set side by side in a kind of mosaic. In 1861, Dr. Warwick published another paper, in which he stated that the cocolites were identical with minute bodies which had been discovered in chalk by Mr. Swaby, who was the first person to point out this interesting circumstance. In the same year Mr. Swaby got a step further, and found that these bodies—which he (Professor Huxley) had called cocolites, from their being concretionary, if they were turned round, no easy matter with so minute an object—were concave—such things as might be cut out of a hollow sphere of glass; that they were, in fact, like thick watch glasses; and he showed that they could not be concretious—that is, that they could not be of animal nature. He (Professor Huxley) re-examined the specimens of the deep sea soundings, by applying to them a much higher magnifying power than he had used before. He might mention that all persons who had been concerned in bringing up Atlantic mud spoke of it as being a wonderfully tenacious and sticky substance. He found it to contain an immense number of minute shells, and of an enormous number of little, irregular pellets of jelley, dotted all over. It was to the dotted pellets that he desired to draw attention. On applying a power of 1,200 diameters, they could be analyzed and resolved pretty well. In each of the pellets would be found a great number of granules scattered about, each being the 40.000th to the 20,000th of an inch. These he found were all organic particles, yielding, as they did, to all the changes to which organic bodies yielded when the proper materials were applied to them. The average diameter of each heap of granules was the 12-100th of an inch, and each represented a mass actually living at the depth of the sea, and developed in its slime. So that, intermixed amongst the shell, there was an immense body of jelley, which contained the bodies of the simplest kinds of organisms, each representing a kind of spicula of primitive organism. The fact that those bodies exhisted at the depths he had stated was beyond dispute, so that the depths of the sea contained those living organisms from which old philosophers held that all things proceeded. And some persons were coming round to that opinion again. For his part he expressed no opinion as to whether they were plants or animals. They were, perhaps, the simplest representatives of that ground between plants and animals, as to which so much was said in the present day.—*London Mechanics' Magazine.*

A Novel Gun.

The progress of the proceedings at this year's meeting of the British Association has been unusually diversified. Papers have been read on nearly every subject that can interest and instruct mankind. At one time Professor Huxley has discussed the nature of the organisms found at the bottom of the Atlantic; at another Miss Becker has defended women from the charge of being intellectually inferior to men; Captain Galton has shown how to construct a stove which shall warm and ventilate a room at one and the same time; while, to add another to the incongruous list, Mr. Charlesworth has now described a new gun, whereby men may shoot with great comfort, and animals be slaughtered with great certainty. This gun appears at first sight to be constructed on a mistaken plan. It is to be held in the outstretched hand, in place of being fired from the shoulder. Professedly it is an improvement on the old walking-stick gun. The latter resembled an elongated pistol. Like the pistol, it could not be held steadily enough so as to ensure precision in the practice. The improvement consists in employing what is styled an elevator—that is, a sort of straight handle projecting from the under side of the barrel close to the breech, and grasped by the one hand, while the handle at the end is held by the other. As is the rule in the case of new inventions or the modification of old arrangements, great advantages are claimed for this alteration. As a fowling-piece or rifle the new gun is said to excel. It is obvious that if this be substantiated, then the customary form of stock and barrel must be abandoned in favor of the hand-gun. In one respect the new gun is a retrogression, for the method of firing it is almost identical with that of discharging an arrow from a bow. This may be the right way after all, but we should like to have additional testimony in favor of the change before approving of it. What with rifling muskets and then transforming muzzle loading rifles into breech-loaders, there have been incessant alterations in fire-arms for some years back. Although the army must be furnished with the most efficient weapon, the public will yet feel dissatisfied should it be found that the soldiers' rifles must be adapted to Mr. Charlesworth's plan in order to perfect them. Improvements in fire-arms are very numerous, and they are most ingenious.—*Daily News.*

The Berlioz Electric Light.

A new electric light exhibited nightly on the steamer *St. Laurent*, at Pier 50 North river, New York city, has attracted a great deal of attention. The *Sun* gives as good an idea of the nature and advantages of this new application of electricity as we should hope to do without an extended description, for which we have not room in this issue:

"This light is produced by the burning of carbon pencils in currents of electricity. The latter are furnished by induction, and without the use of bateries, by an improved form of Nollet's apparatus. This consists of forty series of horse shoe magnets set in a circular frame, within which is an axis bearing sixty-four reels of copper wire, and revolving before the magnets at the rate of three hundred turns a minute. A double current of electricity is thus induced in the copper wires, the one direct as they approach the poles, the other reversed after they have passed them. No device for breaking the currents is used, as it is found that, though the current is interrupted at each reversion, the light is not perceptibly affected unless the interruption exceeds one twentieth of a second.

"The magnetic apparatus is about four feet six inches square; it stands in the engine room of the *St. Laurent*, and is driven by a donkey engine of one or two horse power. The electricity is conveyed to the lantern by wires. The cost of the light is about twelve cents an hour; the same amount of light by gas would cost two dollars. The light is displayed on the *St. Laurent*, through a Foucault lens, which can be turned by hand in any direction, placed on the bridge above the deck. It is perceptible at sea to the remotest distance at which any object can be seen; at three miles the name of a vessel can easily be read by it with a glass. In fogs it is of the greatest value. So it is in entering harbors by night. It will render collisions in the dark almost impossible."

Alloys.

Most metals are capable of uniting with others, the combination forming what are termed alloys. These are chemical compounds; not, as some persons suppose, simply mixtures. In many cases, when one metal unites with another, the alloy gives scarcely any indications of the characters of the component metals. Thus, copper alloyed with aluminum, in the proportion of 90 of the former to 10 of the latter, gives the alloy called aluminum gold. Again, the alloy called Regulus of Venus, so named from its beautiful violet color, consists of equal weights of copper and antimony, neither of which metals is at all similar to the resulting alloy. Some metals, when alloyed, although they undergo no peculiar modification in color, do so with regard to some other of their natural properties, the difference of melting temperature being perhaps the most remarkable. Of this class, plumbers' solder, which consists of 2 parts of lead, fused with 1 of tin, sand the alloys in which these proportions are reversed to 2 parts of tin and 1 of lead, are the best known, and are much more fusible than either of the metals used in making them. A remarkable alloy of this class is that of bismuth, which melts at 500° Fah.; lead, which melts at 600° Fah.; and tin, which melts at 442° Fah.; in the proportions of 8 of bismuth, 5 of lead, and 3 of tin. This alloy melts below the boiling point of water, or 212° Fah., although even the most fusible of its components requires more than double that temperature to melt it. Toy teaspoons are made of this alloy. When used to stir hot tea, the bowls of the spoons all disappear to the bottom of the cup. The alloy of bismuth 8, lead 4, cadmium 2, and tin 2, melts at 160° Fah.; that is 52° below the boiling point of water. There is one more alloy which may be mentioned, on account of its peculiarity of being liquid at the ordinary temperature, there being only one other metal liquid under the same conditions; namely, mercury. This alloy consists of equal parts of potassium and sodium. Both of these metals are solid at the ordinary temperature; but when alloyed in equal proportions, they remain liquid.—*Piesse.*

Faraday.

Faraday once confided to Dr. Tyndall that at a certain period of his career he was forced definitely to ask himself, and finally to decide, whether he should make wealth or science the pursuit of his life. It was a second choice of Hercules. He could not serve both masters; he was therefore compelled to choose between them. After the discovery of magno-electricity his fame was so noised abroad that the commercial world would hardly have considered any remuneration too high for the aid of abilities like his. Even before he became so famous he had done a little "professional business." This was the phrase he applied to his purely commercial work. His friend, Richard Phillips, for example, had induced him to undertake a number of analyses, which produced in the year 1830 an addition to his income of more than a thousand pounds; and in 1831 a still larger sum. He had only to will it, in 1832, to raise his professional business income to five thousand a year. This, indeed, is a wholly insufficient estimate of what he might, with ease, have realized annually during the last thirty years of his life.

To Prepare Nitroglucose.—Two fluid ounces of fuming sulphuric acid, two of common sulphuric, two of strong nitric acid, as near to 1·5 sp. gr. as can be obtained, give good results. The sugar is stirred in, in the form of powder, to a thin paste. The stirring is kept up, and as fast as the nitroglucose separates in doughy masses, it is removed with a glass spatula, and thrown into cold water. A further addition of sugar will give more nitroglucose, but considerably less in proportion than the first addition. As soon as possible the nitroglucose is to be kneaded up with cold water, to get the acid out. When dry, it forms a white doughy mass, having sometimes a crystalline tendency. It is best preserved under water. This substance is more explosive than gunpowder, and is supposed to be identical with Nobel's dynamite.—*Septimus Piesse.*

Traction Engines.—We are having inquiries about this class of engines which we are unable to answer. Manufacturers, we think, would do well to advertise them in our paper.

England is about to adopt the American plan of transporting petroleum, by railroad, in elevated iron cars.

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ON SOME CONSTITUENTS OF COTTON FIBER.

Dr. E. Schunck has published a paper on the constituents of cotton fiber, having for its object the throwing of more light on the nature of those substances which are contained in or attached to the framework of cellulose; of which cotton fiber mainly consists, and which are, together with the latter, produced by the plant. All foreign and extraneous matter introduced during the process of manufacture was, therefore, left entirely out of consideration. The author has further confined his attention to those constituents of the fiber which are insoluble in water but soluble in alkaline lye, and are afterward precipitated by acid from the alkaline solution. Whether cotton contains naturally any substance soluble in water, or which being originally insoluble, is rendered soluble therein by the prolonged action of alkalies is a question on which the author pronounces no decided opinion.

For the purpose of obtaining the substances which he proposed to examine, the author employed cotton yarn, which he preferred to unspun cotton for several reasons; the principal being that yarn is comparatively free from mechanical impurities, such as fragments of seed vessels, etc., while, on the other hand, if proper care be taken, no impurity is added to to those previously existing during the process of spinning. The yarn was boiled in an ordinary bachelor's kier for several hours with a dilute solution of soda ash. The resulting dark brown liquor, after the yarn has been taken out, drained, and slightly washed, was removed from the kier into appropriate vessels, and mixed with an excess of sulphuric acid, which produced a copious, light brown, flocculent precipitate, while the liquid became colorless. This precipitate was allowed to settle, the liquid was poured off, and, after being washed with cold water, to remove the sulphate of soda and excess of acid, it was put on calico strainers and allowed to drain. A thick pulp was thus obtained, which, when dried, assumed the appearance of a brown, brittle, horn-like substance, translucent at the edges. In one experiment, 450 lbs. of yarn, made from East Indian cotton, of the variety called "Dhollerah," yielded 0·33 per cent of the dried precipitate. In another experiment made with 500 lbs. of yarn, spun from American cotton, of the kind called in commerce 'middling Orleans," 0·48 per cent was obtained. The total loss sustained by yarn during the bleaching process amounts to about five per cent of its weight. Only a small portion of the matter lost is therefore recovered by precipitation of the alkaline extract with acid.

This precipitate formed more especially the subject of the author's investigation. It was found to consist almost entirely of organic substances, and of these the following were distinctly recognized:

1. A species of vegetable wax.
2. A fatty acid.
3, 4. Coloring matters.
5. Pectic acid.
6. A trace of albuminous matter.

The author described the method employed by him for separating these substances from one another, and obtaining them in a state of purity; and he then gave an account of their properties and composition. The waxy matter is by far the most interesting of these substances. It is insoluble in water, but soluble in alcohol and ether. If a concentrated solution in boiling alcohol be allowed to cool, the greatest part is deposited, causing the liquid to assume the appearance of a thick white jelly, consisting of microscopic needles or scales. When this jelly is filtered off and dried, it shrinks very much, and is converted into a coherent cake, which has a waxy luster, and is translucent, friable, and lighter than water. Its melting point is between 83° and 84° C. At a higher temperature it is volatilized. When heated on platinum it burns with a very bright flame. The author thinks it probable that this substance covers the cotton fibers with a thin, waxy film, and thus imparts to them their well-known property of resisting water. In its properties and composition it approaches very nearly the better-known vegetable waxes, such as that obtained by Avequin from the leaves of the sugar cane, and that which is found on the leaves of the Carnauba palm. The The author thinks that the name *cotton wax* is sufficient to distinguish it from these and other nearly allied bodies.

The fatty acid has the properties and composition of margaric acid. It is white and crystalline, fuses at 53° C., and gives, with alkalies, compounds soluble in water which are true soaps. It is, however, probably not a natural constituent of cotton fiber, but rather an impurity derived from the oil of the seed which escapes and diffuses itself among the cotton before or during the process of ginning. It might also have had its source in the oil and fat used for greasing the cotton-spinning machinery, since the author employed yarn in all his experiments. Persons practically conversant with cotton spinning affirm, however, that if ordinary care be taken, it is impossible that the cotton can become contaminated with anything of a fatty nature during its conversion into yarn.

The coloring matters obtained in these experiments are, without doubt the substances to which raw cotton owes its yellowish or brownish color. The author was able to distinguish two bodies of dark brown color, which occurred in all kinds of cotton examined by him. Of these, one is easily soluble in cold alcohol, and is left, on evaporation of the solution, as a dark brown, shining, brittle, amorphous resin, which is transparent in thin layers. In boiling water it softens and melts to a pasty mass, which becomes hard and brittle again on cooling. When heated on platinum foil it burns with a bright flame, leaving a very voluminous coal. It is nearly insoluble in ether. It dissolves easily in concentrated sulphuric acid and glacial acetic acid, with a brown color. It also dissolves with ease in caustic and carbonated alkalies, giving dark, yellowish brown solutions, from which it is re-precipitated by acids in light brown flocks. The other coloring matter resembles this in most of its properties. It is, however, much less soluble in alcohol. Cold alcohol, indeed, dissolves only a trace, but in boiling alcohol, it is dissolved with tolerable facility, being re-deposited, on the solution cooling, in the form of a brown powder. This powder, when filtered off and dried, forms coherent masses of a color varying from light to dark brown, which are easily broken, showing a dull, earthy fracture. Both coloring matters contain nitrogen, and they differ therefore in constitution from true resins, which they resemble in many of their properties. The peculiar color of the so-called "Nankin cotton" is probably due to a great excess of these coloring matters existing in the fiber. It is certainly not caused by oxide of iron.—*Mechanics' Mag.*

The New Atlantic Cable.

The Paris *Moniteur* announced officially, Sept. 24, that the Government concession lately granted in favor of MM. Erlanger and Reuter, of the Franco-American Telegraph Company, authorizing them to lay a submarine telegraph cable between France and America under certain reserved conditions, has become definite and complete; capital to the amount of 27,500,000fr.—the main condition—having been subscribed for the undertaking. The concession for this great work bears date July 6, 1868, and confers the privilege of laying and working submarine telegraphs between France and the United States.

The cable will, as at present proposed, be laid in two sections; the first from Brest to the French island of St. Pierre, off Newfoundland; the second from St. Pierre either to New York direct or to a point between Boston and New York, with a special line to New York. The length of the cable is as follows: First section, from Brest to St. Pierre, 2,325 miles; second section, from St. Pierre to the United States, about 722 miles; total, 3,047 miles.

A contract has been entered into with the Telegraph Construction and Maintenance Company to manufacture and lay this cable for the sum of £920,000.

The financial calculations and scientific experiments of the new company set forth the following results: The power of transmission of the cable is estimated at a minimum of twelve words per minute, which, allowing fourteen hours a day for waste time and only ten hours a day for actual work, and taking three hundred working days in the year, gives, at the rate of £2 per message, an annual income of £432,000. The working expenses of the line are calculated at £30,000 per annum.

In connection with this enterprise it is interesting to state that the French dispatch boat *Travailleur*, from Rochefort, has been ordered to the Mediterranean to assist in laying down the submarine cable to connect the telegraphic lines of Algeria with the coasts of France.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING SEPTEMBER 29, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

82,474.—HORSE RAKE.—John W. Acker, Copenhagen, N. Y.

I claim the foot frame J, when its operating handle, L, is adapted to slide in slots formed in the ends of the bars, G, as herein described, for the purpose specified.

82,475.—PUMPING ENGINE.—Robt. Allison, Port Carbon, Pa.

I claim, 1st, The arrangement of the sliding bar, L, cam slot, q, rods, n n, and bell crank, R, whereby the supplementary valve, k, is operated, substantially as shown and described.

2d, The valve chambers, J', valves, K', and reversed stuffing boxes, b', arranged substantially as shown and described for the purposes set forth.

3d, The arrangement of the piston, w, graduating cock, y, and cylinder, V, with reference to the rod, E, pistons, G G, and main valve, C, as hereby shown and described.

82,476.—MACHINE FOR POINTING HORSE-SHOE NAILS.—Daniel Armstrong, Chicago, Ill.

I claim, 1st, The die-cleaner, V X, pivoted to the plate, A, and operated by the cam, K, in combination with the two part die, O O, as and for the purpose specified.

2d, The combination of the die cleaner, V X, die, O O, guides, n, and punch, H, substantially as described and shown.

82,477.—WEIGHING APPARATUS.—George Babson and John L. Babson, Rockport, Mass. Antedated September 17, 1868.

We claim our improved arrangement of the scale pan rod, C, the arms, b and f, and the pendulum, B, combined with the curve rack, h, employed with the pinion, i, and its dial conductor, m, the whole being substantially as described.

82,478.—SURGICAL SPLINT.—H. D. Ballard, Findlay, Ohio, assignor to himself and Isaac Bonham, same place.

I claim the improved splint, composed of the parts, A and A', provided with the spring extension joint and with the adhesive straps, all substantially as and for the purpose described.

82,479.—COMPOUND FOR CLEANING SILVERWARE, JEWELRY, ETC.—G. H. Baxter, Geneseo, Ill.

I claim the above described "Yeoman's Magnetic Renewer and Cleanser," composed and operating substantially as and for the purposes set forth.

82,480.—LAMP BURNER.—Edward C Blakeslee (a signor to Benedict and Burnham Manufacturing Company), Waterbury, Conn.

I claim, combining with a perforated base, provided with the vertical strips of metal, F, and cone, C, the bulb, E, and wick tube, B, when the same shall be constructed and arranged to operate substantially as shown, and for the purposes indicated.

82,481.—MACHINE FOR BENDING THE TOPS AND BOTTOMS OF THE BODIES OF TIN CANS.—Elphalet W. Bliss, Brooklyn, N. Y.

I claim, 1st, The square or pyramidal cam slide, in combination with the rigid central guide, the cam levers, and the four clamping jaws, substantially set forth.

2d, The combination of the cam slide with the swinging levers, M, and treadle, L, substantially as set forth.

3d, The arrangement and combination of the cap, O, lever, P, connecting rod, R, and treadle, S, substantially as described.

82,482.—SEAT FOR RAILWAY CAR.—Hannibal S. Blood, Jefferson, La.

I claim the slotted bar, B, when provided with the double slotted cross arm, C, in combination with the socket pieces, D, and the pins, a, when these several parts are constructed, arranged, and operate substantially as herein described for the purpose set forth.

82,483.—AXLE FOR CARRIAGE.—W. D. Bollinger, Cedar Rapids, Iowa.

I claim axles for wagons, cars, and other carriages, made in two parts, at A and B, and connected together, substantially as and for the purpose described.

82,484.—STUMP EXTRACTOR.—T. J. Booth, Jefferson Line, Pa.

I claim, 1st, The combination, in a stump extracting machine, of a trestle frame, constructed as described, with the tackle drum, and sweep bar, when arranged and operating substantially as shown and described.

2d, The coupling clutch, r r, and its accessory mechanism, when arranged to operate substantially as described, in combination with the drum, tackle sweep bar, and trestle frame, all as set forth.

3d, The clevises, m, rollers, n, and hooks, p and o, substantially as described in combination with the stump extractor above described, for the purpose set forth.

82,485.—HORSE HAY FORK.—William D. Brooks, Bethany, Pa.

I claim the beveled lever, E, pivoted in the ring, F, and slotted at e, to engage with the projections, d, upon the levers, D, its forward end slotted to work upon the rib, f, in the inner side of the ring, F, said lever, E, adapted to be raised to receive the levers, D, by means of the angular lever, G, also pivoted in the ring, F, as herein described for the purpose specified.

82,486.—CASING FOR WATER WHEEL.—James D. Bryson, New Castle, Pa.

I claim a casing for water wheels, consisting of the curb, A, the flange, B, the ring, B', supported upon the guide plates, C, and the gate, D, all constructed and arranged to operate substantially as described.

82,487.—FAGOT FOR BEAM.—Henry T. Buffington, Jr., Buffalo, N. Y.

I claim, 1st, The sectional web plates, A, arranged with their fibres running transversely through the pile, in combination with the longitudinal side binding plates, B, as and for the purpose set forth.

2d, The cross clamp plates, provided with the T-heads E, in combination with the flange pieces, C, and side binding plates, B, as and for the purpose set forth.

82,488.—DRYING AND BURNING KILN.—Jacob Buhrer, Munich, Bavaria.—Patented in England, February 28, 1867.

I claim a drying kiln, as shown, consisting of a series of compartments placed back to back in a double row, and provided with the openings, g, hot air supply and escape flues, a b c d e and f, and communicating apertures, m and n, in combination with a burning oven, also consisting of a number of compartments similarly disposed to those of the kiln, and provided with the openings, d' and e', all the parts being constructed and arranged as and for the purposes herein set forth.

82,489.—TRACE BUCKLE.—W. G. Bunker, Portage, Wis.

I claim the buckle, consisting of the frame, A, having the cross plate, a, with the sliding plate, B, secured thereto by the slot and pin, b, and having the rigid tongue, C, all constructed and arranged as herein described.

82,490.—FISH NET.—Thomas Cartwright, Davenport, Iowa.

I claim the application of the fyke or net, E D C, to the boat, in the manner described, that is to say, by means of the bow cords, d, attached to the transverse bars, c, and the stern cord, e, attached to the bag C, as herein set forth and shown.

82,491.—ZINCING OR TINNING BATH.—Frederic Chase, Philadelphia, Pa.

I claim a zincing or tinning bath or vessel, constructed bodily of fire clay, or its equivalent earthy substance, substantially as described.

Also, constructing a zincing or tinning bath of fire clay, or its equivalent, substantially in the manner set forth and described.

82,492.—BRICK MACHINE.—Peter Clark, Brooklyn, N. Y. Antedated Sept. 24, 1868.

I claim, 1st, The combination, in a machine for making bricks, of an endless chain of molds, A, having detachable sliding bottoms, a, with a suitable pug mill, C, and with compressing and discharging plungers, E F, while said sliding bottoms are successively transferred from the charged molds to those last emptied, to open the one and close the other, all substantially in the manner and for the purpose herein set forth.

2d, The improved mold frames, A, provided with and closed by sliding bottoms, a and combined in an endless chain, substantially in the manner and for the purpose herein set forth.

3d, The sliding rack, s s, operated by toothed sectors, R, and arranged to engage with and transfer the detachable bottoms, a, of the mold frames, A, from charged molds to those last emptied, substantially in the manner and for the purpose herein set forth.

4th, The combination of a swinging connecting beam, J, links, e, and weighted pawls, f f, with ratchets, S S, on the polygonal wheels, B B, and the endless chain of molds, A A, arranged and operating substantially as and for the purpose herein described.

82,493.—FOLDING CHAIR.—A. Collignon (assignor to himself, C. O. Collignon, and N. Collignon), Closter, N. J.

I claim the parts, A B D and F, constructed, arranged, and combined substantially as shown and described for the purposes set forth.

82,494.—FOLDING CHAIR.—C. O. Collignon and N. Collignon, Closter, N. J.

We claim the combination and arrangement of the stand, A, seat, B, back leg, C, and brace, E, constructed substantially as described, and for the purposes set forth.

82,495.—LAMP BURNER.—William R. Cranna, San Francisco, Cal.

I claim, 1st, The combination, with the base of the burner and its shortened wick tube, and the elevated deflector, of a combined air flue and wick holder, with openings, l, as described, and sleeve or cap, J, supported upon the upper part of said flue and wick holder, substantially as and for the purpose specified.

2d, The combination, with the combined air flue and wick holder, and the sleeve or cap, J, of the perforated casing or jacket by which the same are surrounded, as and for the purposes set forth.

3d, The method of attaching the deflector and of securing it in position, by means of arms, a, fitted into sockets formed on the burner for their reception, in the manner described.

82,496.—TRUNK.—George Crouch, New York city.

I claim, 1st, The combination, with a trunk, A, of a hat or bonnet apartment constructed as described, and located in the tray, C, centrally, as shown, for the purposes set forth.

2d, Giving access to the same, either from the bottom or top of the tray, C as shown.

82,497.—CHIMNEY COWL.—J. J Currier, Gloucester, Mass.

I claim the combination, as well as the arrangement, of the three frusta, B C D the cover, E, and the tube, A, the whole being connected so as to operate substantially as described.

82,498.—AUTOMATIC BOILER FEEDER.—Job A. Davis, Watertown, N. Y.

I claim, 1st, The combination and arrangement of the water-supply tank, D, the valve pipes, E and F, and inlet tube, G, with the valves, a b and c, substantially as described.

2d, The arrangement of the rod, e, and connection arms, f f f, for simultaneously operating the several valves connected with the supply tank, D, substantially as set forth.

82,499.—SHUTTLE FOR SEWING MACHINE.—Job. A. Davis, Watertown, N. Y.

I claim the combination, with the shuttle and its bobbin, of the spring, C, constructed as described, fitted loosely in the shuttle case, and adjustable by a screw, for the purpose set forth.

82,500.—SAWSET.—Christian Deyhle, Hartford, Conn.

I claim, 1st, The combination and arrangement of rack, b b, screw, d, and spring, u, when used for the purpose of adjusting the inclination of rack, b b, as described.

2d, The supporter, o o.

3d, The saw holders, k and l, when used in combination with rack, b b, and supporter, o, for the purpose set forth.

82,501.—SCROLL SAW.—W. Dobson (assignor to himself and J. W. Mount), Medina, N. Y.

I claim a sheet iron, or other saw-holding loop, c, made very narrow laterally, and with the saw, B, run between guides, F, below the table, A, substantially as herein shown and for the purpose described.

82,502.—ELECTRO-MAGNETIC PRINTING TELEGRAPH.—Pierre Antoine Joseph Dujardin, Lille, France.

I claim, 1st, In a printing telegraph, the construction and application of cross type wheels, oscillating on their common axis, and the mechanical means described, or other equivalents to produce their oscillating motions.

2d, The construction and application of the adjustable inking plug, in combination with the double printing wheels, substantially as described.

82,503.—SYSTEM OF SEEDING AND MANURING.—A. F. Eckhardt, Hamburg, Germany.

I claim the covering of artificially manured seed of all kinds with a case or capsule, insoluble in water, as herein described, using for that purpose the aforesaid process and compound, or any other substantially the same, and which will produce the intended effect.

82,504.—MITER MACHINE.—J. H. Estes, Boston, Mass. Antedated Sept. 16, 1868.

I claim the hinged frame, C, provided with slots, N, for the passage of the saw, and with a plane rest, M, by which the bevel is not only sawed with a saw, but afterward dressed with a plane, all constructed to operate substantially as described.

82,505.—HAY KNIFE.—C. A. Fisher, Geneseo, Ill.

I claim the socket, D, the wooden handle, C, the bend, C', and the blade, A when the same are formed and combined, substantially as shown and described for the purposes set forth.

82,506.—COMPOSITION FOR FIRE KINDLING.—W. P. Winkley, Des Moines, Iowa.

I claim the composition of rosin, pitch, charcoal, and bituminous coal, in the proportions and manner substantially as herein described, as a new article of kindling.

82,507.—ELASTIC ROOFING COMPOSITION.—T. E. Wood, Knoxville, Pa.

I claim the elastic roofing composition made of the ingredients and in the proportions herein specified, compounded and applied in the manner set forth.

82,508.—APPARATUS FOR JOINTING CIRCULAR SAWS.—Isaac France, Peru, Ind.

I claim the slide support, A, arranged to be connected to the saw mandrel, and provided with the support, F, and slides, D and E, substantially as and for the purpose set forth.

82,509.—ICE CREAM FREEZER.—W. A. Garloch and W. D. Richards, Belpre, Ohio.

We claim the sleeve, K, secured to the cover of the inner case, and having

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formed upon its upper end the pinion, J. said sleeve being supported in position to operate the inner case by the continuous dasher shaft only, as herein shown and described.

82,510.—CARRIAGE SPRING.—E. L. Gaylord, Terryville, Conn.

I claim, 1st, A spring for wheel vehicles, composed of two bars, bent so as to diverge from each other, from their central parts outward toward each end, and at the same time have a longitudinal, curved, and twisted or torsal form, substantially as shown and described.

2d, The attaching of the ends of the springs to the bolster and axle of the vehicle by means of the swivel clips, F, constructed substantially as shown and described.

82,511.—BRICK-KILN.—William Gilbert, Detroit. Mich.

I claim a progressive burning and cooling kiln, composed of the furnace, C, and cooling room, J, enclosed and separated by the vertically sliding gates G G' G", and furnished with the inclined track, a b, the fireplaces, E, on either side the furnace, and the chimney, H, all arranged with relation to each other, and operating substantially as and for the purposes herein set forth.

82,512.—COMBINED ROLLER AND HARROW.—Jacob Ginther, (assignor to himself, William Friend, and William Seibert), Mier, Ill.

I claim the combination of the lever, J, connecting rod, K, elbow lever, H, and connecting-rod, I, with the roller frame, A, and harrow frame, E, substantially as herein shown and described, and for the purpose set forth.

82,513.—WRENCH.—John Goodin, Centralia, Ill.

I claim the arrangement of the notched cam wheel, F, pawl, d. spring, e, for the purpose of adjusting the movable jaw on a monkey-wrench, constructed and operating substantially as herein set forth.

82,514.—CALIPER.—Thomas Goodrum, Providence, R. I. Antedated September 16, 1868.

I claim the rod, A, in connection with B, and as fitted to its seat, substantially as described, and for the purpose as set forth.

82,515.—CORN PLANTER.—William B. Goodwin, Effingham, Ill.

I claim the combination, with a corn planting machine, of the marking rods, d6, substantially as and for the purpose described.

Operating the markers, d6, from the crank shaft, d2, by means of the connecting rods, d3, rocker arm, d4, substantially as and for the purpose described.

Operating the dropper slide, by means of the crank shaft, d2, acting on the cam projections, g g, substantially as and for the purpose described.

The arrangement of the hopper, E, plate, f, perforated ends of the dropper arm, d5, and the tubular plows, substantially as and for the purpose described.

82,516.—PROPELLING APPARATUS.—James Granger, Zanesville, Ohio.

I claim the traveling bridge, A, constructed substantially as shown and described, in combination with a chain propelling wheel, and for the purposes set forth.

82,517.—TANNING COMPOUND.—B. F. Gross, Trenton, Tenn.

I claim the tanning compound composed of the ingredients named above, and in about the proportions given, substantially as and for the purposes set forth.

82,518.—SAW MILL.—Allin Hackett, Pittsfield, Me.

1 claim, 1st, The gage device, constructed as described, of the plate, S, bearing the roller, P, and jointed at m, to the plate R, which is operated in a recess of the graduated part, U, by means of the feed screw, O, and hand wheel, n, all arranged and operating as described for the purpose specified.

2d, The described arrangement of the setting up mechanism upon the head block, consisting of the sliding block, o, rack c, standards, L M, pointer, h, indicator wheel d, having the toothed part, e, the pins, e', lever, K, bearing the pawls, a b, the standard 1, and slotted notched bar, J, all operating as described for the purpose specified.

82,519.—APPARATUS FOR DISTILLING SPIRITS.—Francois Haeck, Brussels, Belgium. Antedated September 16, 1868.

I claim, 1st, A still, having a continuous action, by causing the liquid to flow through a series of channels successively, in such manner that the incoming liquid is restrained from mixing with the outgoing, and so that, in its passage through the still, the evaporation is produced by its travel over steam pipes having independent inlets and outlets, so as to establish an equality, or thereabouts, of heating action throughout the several channels of the still, substantially as specified.

2d, The combination, with the channels of the still, and arrangement over them, substantially as described, of the condensing plate, surface, or vessel, T, essentially as and for the poupose or purposes herein set forth.

82,520.—STEAM SLIDE VALVE.—J. R. Hall, Salem, Ohio.

I claim the arrangement of the valve, D, with its chambers, b b1 b2, the recessed followers, e e1 e2, with the central passages, h h1 h2, and the passages, a1 a2 a2, whereby to balance the pressure of steam upon the valve, substantially as herein set forth.

82,521.—BED BOTTOM.—William M. Hamilton, Wenona, Ill.

I claim, 1st. The straps, D, having rings, V V, at their ends, in combination with the standards, I, slats, H, and diagonal braces, c c, substantially as set forth.

2d, The standards, I I', plates, J J, springs, C, slats, H, straps, D, rings, V V, and braces, c and E, as and for the purpose specified.

82,522.—LUBRICATOR.—John Harlin, New York city.

I claim in combination with the plug, C, of the lubricator. said plug having parallel apertures, d e, the packing, h, collar, g, and screw cap, D, arranged as described for the purpose specified.

82,523.—PAINT OIL.—David R. P. Hill, Morgantown, W. Va.

I claim an improved paint oil prepared of the ingredients, in the proportions and manner substantially as herein described and set forth.

82,524.—SEED PLANTER.—Andrew J. Holt, Peru, Ind.

I claim, 1st, The hinged lever, E G, for moving the horizontal dropping bar, D, and its mode of disconnection with the wheel, B.

2d, In combination with the above named devices, the mode of applying and using the inclined planes, J J, so as to produce the lateral alternate movement of the dropping bar, D, through the medium of the lever, E G.

3d, The adjustable markers, K K, for the purpose of showing the point where the grain is deposited; and

4th, The application of the rod, M, for arresting the revolution of the wheel, B, at the point of dropping.

82,525.—GALVANO-PLASTIC PROCESS FOR PRECIPITATING IRON ON MOLDS, ETC.—Maurice H. Jacobi and Eugene Klein, St. Petersburg, Russia, assignors to Green, Clay & Co.

We claim the process of precipitating iron on molds, in the manner substantially as and for the purposes herein set forth.

82,526.—PAPER PAIL, ETC.—Augustus Jennings and Isaac Jennings, Fairfield, Conn.

We claim securing the bottom or head, B, formed with an outwardly projecting flange, to the body, A, to the vessel, by means of the metallic binding, C, substantially in the manner herein shown and described.

82,527.—REVERSIBLE RAILWAY CHAIR.—Wm. H. Joeckel, New York city.

I claim the chair consisting of the uprights, A, pivoted seat, B, swinging back, C, and sliding bars, D E, all made, combined, and operating substantially as herein shown and described.

82,528.—CONSTRUCTION OF HORSESHOES.—P. C. Johnson and Edwin Froggott, Central City, Colorado.

We claim the arms, b d, attached to or formed with the calks, and bent down into holes in the bottom or under side of the shoe, to form a locking device, in combination with the screws, a, substantially as shown and described.

82,529.—ROOFING COMPOUND.—Joseph A. Jones (assignor to himself and John Donaldson), Baltimore, Me.

I claim a compound consisting of the ingredients mentioned, and applied to roofs substantially as and for the purposes herein set forth.

82,530.—CARRIAGE WHEEL.—J. B. Jones, Sparta, Ill.

I claim the metallic hub, A, provided with a dovetail recess, a, extending circumferentially around it in connection with the wooden spokes, B, with metal sockets at their lower ends, and provided at their inner ends with dovetail tenons, d, fitted in the hub, substantially as shown and described.

82,531.—CORN PLANTER.—Samuel W. Jones, Bluffton, Ind.

I claim the slide, C, fitted in the seed box or hopper, D, and passing through the staff, A, in combination with the bent lever, E, connected with the slide, C, the lever, B, and the lower spring or elastic part, f, of the spout, F, all arranged to operate substantially as and for the purpose herein shown and described.

82,532.—GRINDING MILL.—Frank Kaiser, Buffalo, N. Y.

I claim the construction and arrangement of the serrated drum, B, adjustable curved plate, C, set screws, c1 c1, with notched heads and pawls, d, the hopper, E, oscillating suspended bottom, F, slotted arm, h2, spout, a2, inclined sieve, J, and rock shaft, K, substantially as described, for the purpose specified.

82,533.—SHEEP SHEARING DEVICE.—Wm. S. Lane, Beaver Dam, N. Y.

I claim a trough for shearing sheep, in combination with a frame, so arranged that it may be adjusted by the foot to suit the operator, and substantially in the manner herein shown and described.

82,534.—STEAM GENERATOR.—Victor Langlois, Cherbourg, France.

I claim, 1st, The construction and arrangement of the tubes, a, having the threaded ends, b, and external caps, c, the lead packing, f, rings, A, and plates, P P', substantially as herein shown and described.

2d, The various tools for effecting such work of the plates and tubes as I have described, and also for putting up and off the said movable tubes, substantially as described.

82,535.—HARVESTER.—Christopher Lidren (assignor to himself and R. Jackson), Lafayette, Ind.

I claim, 1st, The combination of the hubs, b, frame, C, and clutches, E, with the shipping lever, Ex, all these parts being arranged and constructed as herein shown and described.

2d, The arrangement of the two cams, G G', axle, A, forked arm, H, box, I, rock shaft, J, rollers, Jx, and vibrating arm, K, substantially as and for the purpose set forth.

3d, The box, I, attached to the arm, H, and the rock shaft, J, fitted therein as shown, whereby proper adjustment may be made for the wear and tear of the rollers, Jx, and the journals and boxes of the rock shaft, substantially as set forth.

4th, Constructing the rollers, Jx, with oil chambers, n, and providing them with exterior surfaces of leather, m, or other suitable material, substantially as and for the purpose specified.

82,536.—TOY GUN.—Charles S. Locke, Watertown, Mass. Antedated Sept. 17, 1868.

I claim in a toy spring pistol or gun, the arrangement of the magazine within the stock, and so as to project over and in rear of the barrel, and of the passage for conveying the balls from the magazine into the barrel, the whole being as represented.

Also, the arrangement of the passage, c, inclining, with respect to the barrel and to the magazine, as and for the purpose specified.

Also, the trigger catch, as made with the ball receiving and retracting recess, or its equivalent.

Also, the combination of the mechanism for advancing the balls in the magazine, with such magazine the barrel, and the mechanism for effecting the expulsion of the balls from the latter, as specified.

Also, The combination of the sliding cover, f', and the sight, g, with the passage, c, opening out of the barrel, and disposed with respect to it and the magazine, as specified.

Also, the combination of mechanism for retracting and releasing the piston in order that it may be advanced by its spring, such mechanism consisting not only of the peculiar lever trigger catch and trigger combined, and provided with a stud or studs, as described, but of the tube, B, or its equivalent, made with longitudinal and transverse slots, and provided with one or two inclined planes and a spring, the whole being arranged substantially in manner and so as to operate as specified.

82,537.—GATE FASTENING.—M. B. Markham, Grass Lake, Mich.

I claim an improved gate fastening formed by the combination of the pivoting arm or bar, D, the three armed bar, E, and the spring catch, F, with each other, said parts being constructed and operating substantially as herein shown and described and for the purpose set forth.

82,538.—STEAM PROPELLER PLOW AND CULTIVATOR.—John Marquis (assignor to himself and Ole Bergerson), San Francisco, Cal. Antedated September 16, 1868.

I claim, 1st, The construction and application of the cutters, C C C, in form similar to that of a screw, and having bits, b b b, at the ends of the blades, substantially as described, for the purpose set forth.

2d, The attachment of the said cutters or screws, in a diagonal manner, to the rear portion of the frame, at such an angle as to overcome the side draft, and impart to the said cutters, in their rotation, a progressive tendency, substantially as described.

3d, The bars or levers, I I, for raising and lowering the frame and cutters, and employing the axle as a fulcrum for that purpose, substantially as described.

82,539.—TREATMENT AND REDUCTION OF TITANIFEROUS IRON ORE.—Charles Martin, Chancery Lane, and William Barrett and Thomas Stammers Webb, Norton, England.

We claim the methods of treating and reducing titaniferous iron ores for the manufacture of iron, and of applying the slag or cinder produced in such processes, substantially as herein before described and set forth, or any mere modifications thereof.

82,540.—ELEVATOR.—N. L. Milburn, St. Louis, Mo.

I claim, 1st, The arrangement of the endless rope, h i, with relation to the frame, A, sheaves, k l, pulley, g, shaft, e, drum, f, and platforms, d, whereby the former is applied in two directions to elevate and lower the platforms, as herein shown and described.

2d, The described construction of the frame, A, having the corner guides, a, and central guide, b, for the platforms, as herein shown and described, for the purpose specified.

82,541.—MEDICAL COMPOUND.—George Mohler, Yates city, Ill.

I claim the compound above described, when composed and used substantially as and for the purposes herein set forth.

82,542.—OPERATING CHAIR.—James Beall Morrison, St. Louis, Mo. Patented in England December 7, 1867.

I claim, 1st, The combination of a universal joint, C, with slides, f, extending upward and downward from said joint, and provided with suitable grooves, in which suitable pieces, n, fast to the body of an operating chair, are made to slide, constructed substantially in the manner and for the purpose described.

2d, The application of a universal joint, E, constructed in the manner hereinbefore described, to the head rest of an operating chair, in combination with the slotted bar, 2, constructed and arranged and operating together in the manner substantially as specified.

3d, A head rest, F, made with two cushions or head supporters, 12 and 13, in combination with a universal joint, E, and slotted bar, 2, arranged and operating in the manner substantially as set forth and specified.

4th, The arrangement of the cruciformed frames, n, attached to the body of the chair, B, the slides, f, attached to the universal joint, C, in combination with the racks, p, and pinions, m, for elevating and depressing the body of the chair, when constructed and combined in the manner and for the purpose substantially as described.

5th, Arms, D, provided with suitable pieces, v, extending downward, and fitting between guide pieces, w, fast on the sides of the chair, and provided with a pinching screw or other device, to fix the arms in any desired position, substantially in the manner and for the purpose described.

82,543.—SKATE.—Edgar Murray, New York city.

I claim the pin, i, guided at one end by the bar or central loop, f', and at the other end by the longitudinal slot, 2, in combination with the clamps, e e, and sliding bar, g, as and for the purposes set forth.

82,544.—NAME PLATE FOR STREET LAMP.—C. J. O'Hara, New Orleans, La.

I claim the mode herein described of marking or placing the names of streets upon street lamps, by means of a transverse supplemental "name plate," C, when the same is provided with an edge-frame, b, beveled ends, and oblate hooks, c c', and is applied or placed within the lamp, as herein described for the purpose set forth.

82,545.—TREAD POWER MACHINE.—Jason P. Pawley, Tiskilwa, Ill., assignor to himself and Franklin B. Ives.

I claim the combined arrangement of the treadle, M, arm, M2, connection, O, spring, N, and shaft, I, substantially as and for the purpose described.

82,546.—FINGER RING.—William H. Peckham, N. Y. city.

I claim, as a new article of manufacture, a finger ring made of cast or rolled metal, with a grooved inner face and with its edges slightly widened to form a bearing surface upon the finger, as herein shown and described.

82,547.—COMBINED HIGH AND LOW PRESSURE STEAM ENGINE.—John C. Pedrick, Washington, D. C. Antedated Sep. 17, 1868.

I claim the arrangement of the valves, i and j, and pipe, k, provided with the flap valve, with reference to the cylinder, as and for the purpose set forth.

82,548.—STEAM PUMPING ENGINE.—George W. Perry, Shenandoah city, Pa.

I claim, 1st, The construction of the cam, p, lug, o, wheel, i, arms, k l, and tappets, c c', substantially as herein shown and described.

2d, In combination with the cam, p, lug, o, wheel, i, arms, k l, and tappets, c c', the arms, f f', strap, h, rod, A, segments, v v', and plunger, r, of the dash pot, as herein shown and described.

82,549.—SHAFT BEARER.—William Platt, Baltimore, Md.

I claim the shaft bearer, A, provided with a means of attachment to the "billet strap," a hook for receiving the shaft, and a loop for the attachment of the securing strap, D, substantially as described and represented.

82,550.—BOAT-DETACHING APPARATUS.—N. M. Ray, Ellsworth, Me.

I claim the lever, D, tine, d, rod, b, and extension, C c, in combination with a tackle block, A, all substantially as shown and described, and for the purpose set forth.

82,551.—KEY HOLE GUARD.—Christopher Read, Jersey City, N. J.

I claim the tumbler, f, the sliding block, g, and the sliding plate, d, in combination with a door lock, operating substantially as shown and described, for closing and unclosing the key hole, when the door is locked on the outside.

82,552.—CORPSE PRESERVER.—John J. Reicherts, Delaware, Ohio.

I claim a corpse preserver, constructed and arranged substantially as shown and described, that is to say, with the parts, A and B, the ice box, F, and either with or without the ice box, G, the air spaces, M, platform, D, perforated false bottom, L, with the double glass, p p, the whole arranged and operating substantially as and for the purposes set forth.

82,553.—COMBINED STALK CUTTER AND HUSKER.—John D. Rice, Cyrus B. Rice, Lawson N. Rice, and Elisha Briggs, Jr., Detroit, Mich.

We claim the reciprocating scrapers, I, the connecting rods, 8, the crank shaft, Y, the pitman, Z, and eccentric, X, when operating and constructed substantially as and for the purposes set forth.

82,554.—INDICATOR FOR KNITTING MACHINE.—J. W. Rist (assignor to himself and Ira A. Hebbard), Rochester, N. Y. Antedated September 16, 1868.

I claim, 1st, The combination of the box or plate of a knitting machine indicator and its indicating hand, with a proportion table, substantially as described, to indicate the number of rounds to be knit, and the number of needles to be employed to form a knitted article of any desired form, size, and proportion.

2d, In combination with the above, the adjustable pointer, G, as and for the purposes set forth.

82,555.—REGISTER FOR KNITTING MACHINE.—J. W. Rist (assignor to himself and John A. Guile; said John a Guile assignor to Ira A. Hebbard), Rochester, N. Y. Antedated September 24, 1858.

I claim the arrangement of the driving spring or latch, b, double stop, d, and ratchet wheel, W, in combination with the set nut, E, and screw, a, substantially in the manner and for the purpose set forth.

82,556.—CUT-OFF FOR STEAM ENGINE.—George J. Roberts, Dayton, Ohio.

I claim, 1st, The valves, D E, and the seats, C C, constructed as herein set forth.

2d, The arrangement of the slide, N, cam, m, arm, o, shaft, P, arm, q, and connecting rod, R, as herein set forth.

82,557.—STEAM COOKING APPARATUS.—Edward Savage, Chicago, Ill.

I claim, 1st, The superheating chamber, C, located at or near the bottom of the cooking apparatus, substantially as described.

2d, The combination of the chamber, A, water vessel, B, and steam chamber, C, connected by the pipes, d e f, all arranged to operate substantially as and for the purpose set forth.

3d, The combination of the coiled pipe, g, superheating chamber, C, water vessel, B, and cooking chamber, A, with the pipes, e f and d, all arranged for joint operation, substantially as described.

82,558.—FANNING MILL.—H. H. Seeley, Hudson, Mich.

I claim, 1st, The window board, E, in combination with the wings, D D, when constructed in a reverse manner from each other, all as herein shown and specified.

2d, The adjustable screen, H, pivoted in the sides of the shoe, F, for the purpose of changing the same to suit any kind of grain, substantially as and for the purposes herein set forth.

3d, The adjustable toll board, I, constructed as described, and operating substantially as and for the purposes herein set forth.

82,559.—METHOD OF MAKING EYE BOLTS OR LINKS WITHOUT WELDING.—George H. Sellers, Phœnixville, Pa.

I claim, in making weldless links, and other similar articles, subjecting the previously swelled up or enlarged end of the bar to the flattening and bulb dies, substantially such as described, for the purpose of transposing the metal from the place where the bolt hole is to be, and driving it toward the perimeter, as any for the purpose herein set forth.

82,560.—COMB.—Joel Smith, Leominster, Mass.

I claim attaching a horn back to the body of a horn comb, substantially as and for the purposes described and set forth.

82,561.—TOY GUN.—Fisher A. Spofford and Matthew G. Raffington, Columbus, Ohio.

We claim providing the barrel of a toy gun with a downward extension or chamber, c, for the reception of the plunger, as described, the trigger raising the plunger out of such chamber, substantially as set forth.

82,562.—CULTIVATOR.—J. C. Stroud, Lockhart, Texas.

I claim, 1st, Adjustably connecting the plow beam, G, with each other, by means of the slotted cross bar, J, to which said beams are bolted, substantially as herein shown and described and for the purposes set forth.

2d, Pivoting the plow beams, G, to the stationary frame, D, by means of the pivoting rod, K, and the pivoting crank rod, L, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the hand lever, O, connecting rod or bar, N, and lever arm, R, with each other and with the rods, K and L, by which the plow beams, G, are pivoted to the frame, D, substantially as herein shown and described and for the purpose set forth.

82,563.—METHOD OF OBTAINING DENTAL MODELS.—Levi Stuck, Bryun, Ohio.

I claim, 1st, The method of obtaining dental model plates of metal directly from the mouth impression, by casting the metal in a perforated or slitted mouth impression, B, substantially as described.

2d, The employment of a slitter or perforated impression cup, C, substantially as described, in combination with a plaster mouth impression, B, vented through the raised surface, a, substantially as described.

3d, As a new article of manufacture, a metallic dental model plate or die, A, when obtained in the manner substantially as herein described.

82,564.—MACHINE FOR DRYING AND STRETCHING FABRICS.—Oliver C. Sweet, Albany, N. Y. Antedated September 24, 1868.

I claim, 1st, The adjustable drying frame, C G, suspended, by means of removable tongs, D D, from a suitable stationary bearing, and made contractible or expansible at will, substantially as herein shown and described.

2d, The hinged adjustable drying frame, C G, arranged as described, in combination with the swinging receiving bar, A, substantially as herein shown and described.

3d, The rollers, l, and cords, m, arranged as described, in combination with the bars, g, standard, I, j, sleeve, i, and arms, h, for the purpose specified.

4th, The stretcher frame, C G, when arranged as described in combination with the tongs, D D, bar, A, post, I, and stretcher, K, all made and operating substantially as herein shown and described.

82,565.—STOVE PIPE DAMPER.—George Tamkin, Newburg, N. Y.

I claim the composite rod, composed of the metallic strips, B G, of different expansibility, riveted together and arranged with relation to the damper and stove pipe, as described, whereby the expansion of said rod causes it to move laterally, and thereby to close the damper, as herein shown and described.

82,566.—GUARD FOR CARPET SWEEPING MACHINE.—Gilbert F. Taylor, New York, N. Y.

I claim the placing around the body, A, of a carpet sweeping machine, the pad, C, connected at its ends by the elastic strip, e, so as to be removable at pleasure, as herein described.

82,567.—STEAM GENERATOR.—Marshall Turley, Council Bluffs, Iowa.

I claim the arrangement of the separate globular sections, C, with the hollow upward inclined screw arms, D, as herein shown and described.

82,568.—NAIL EXTRACTOR.—James Tyzick and Henry W. Eskildson, New York city.

We claim an instrument for drawing driven nails, composed substantially of the lever, A, and shackle, L, with their griping points, D and F, and hinged or linked together by the slotted piece, E, the whole constructed to operate in the manner and for the purpose herein described and represented.

82,569.—AWNING.—Thomas G. Tyler, New York city.

I claim the awning, having its side slats, B, and curved top slats, A, connected together, to form frames, adapted to slide one within the other, by means of the slotted plates, f, and the plates having headed bolts, substantially as herein shown and described.

82,570.—DEVICE FOR UNLOADING HAY.—Garrett Van Sickle, Auburn, N. Y.

I claim, 1st, The combination and arrangement of the binding rope or device with the elevating rope and the combined pulley and hook and its tripping cord, in the manner herein described, whereby the hay or other like material, whatever may be its quantity, is first drawn and compressed into a compact bundle, and then elevated and discharged, as herein shown and set forth.

2d, The combination, with the body of the hay wagon, of uprights, n, and their hooks, for holding and maintaining in position the hay binding ropes, substantially as herein shown and set forth.

3d, A combined pulley and hook, constructed as herein specified and shown in the accompanying drawings.

82,571.—LATHE CHUCK.—John R. Washburn, West Stafford, Conn.

I claim, 1st, The detached key, D, carrying the beveled pinion, b, and adapted to fit into a series of apertures, e, formed through the sides of the case, A, to allow the same pinion and key to be applied at either side of the chuck, whereby the key and pinion serve to operate any number of chucks, as herein shown and described.

2d, The key, D, when provided with a pinion, b, attached to its end, in combination with the perforated case, A, jaws, B, and scroll wheel, C, of a lathe chuck, all made and operating as herein shown and described.

82,572.—TUMBLER STAND.—J. C. Wharton, Nashville, Tenn.

I claim, 1st, The combination, in a tumbler stand, of the concave ray, A, pipe ring, B, having cocks, i, with the racks, a, or their equivalent, and the revolving scrolls, d, all substantially as shown and described, and for the purpose set forth.

2d, The described arrangement for the caps, h, affixed to the lower end of the curved springs pendent from the outside of the racks, a, with relation to the inclined cocks, i, upon the pipe, B, said spring caps being operated by the tumblers, in the manner shown and described for the purpose specified.

82,573.—HARROW AND CULTIVATOR.—A. S. White, Malone, N. Y.

I claim, 1st, A harrow and cultivator, composed of two sides, A A, constructed each of parallel plates, a a, and plate, c, attached to the rear end of the inner plate of the former at an acute angle, the plates, a a, being connected by bolts, b, and the teeth or shares clamped between said plates by the bolts, substantially as shown and described.

2d, Connecting the sides, A A, of the harrow and cultivator to the central plate, B, by means of the curved bars or hooks, a x, passing through it, which bars or hooks pass through holes in the plates, c, and the inner plates, a, of the sides, substantially as shown and described.

3d, The pin, d, fitted in the central plate, B, in combination with the curved bars or hooks, a x, arranged substantially as and for the purpose set forth.

82,574.—COOKING STOVES.—C. Williams, Manchester, N. H.

I claim the arrangement of the hot closet, H, the ash chamber, F, the air heating chamber, I, the fire place, C, the two ovens, A B, and their smoke flues, provided with dampers, as described.

Also, the combination and arrangement of the auxiliary air heating chamber, D, with the fire place, C, the air receiving and heating chamber, I, the ash chamber, F, and the hot closet, H.

Also, the arrangement and combination of the air heating chambers, D I the hot closet, H, the ash chamber, F, the fire place, C, the two ovens, A B, and their flues, provided with dampers as described.

82,575.—VALVE GEAR FOR STEAM ENGINES.—Furman R. Wilson, Philadelphia, Pa.

I claim, 1st, The construction of the levers, H H H, in the manner substantially as described and for the purpose set forth.

2d, The arrangement of the cams, G G, and lever, H H H, and fulcrum or lug plate, J, with reference to the valve rods, E E.

82,576.—TREATING IRON ORE, ETC.—Henry Aitken, Falkirk, Scotland.

I claim, 1st, Coking iron stone or iron ore upon a perforated platform, through the openings in which, and through a mass of stone or ore, the gaseous products of the coking operation are drawn downward, for the purpose described.

2d, Utilizing the gaseous products of the coking of iron stone or ore, substantially as specified.

3d, The coking or carbonizing of iron ores or iron stones, in combination with carbonaceous or hydrocarbonaceous matter.

4th, The employment of crude oils or tar, or oily or tarry matter, for hardening coked or carbonized iron ores or iron stones.

82,577.—POCKET BOOK FASTENING.—J. C. Arms, Northampton, Mass.

I claim the clasp or fastening, consisting of the plate, C, slide, D, and clip, B, or their equivalents, constructed and arranged to operate substantially as and for the purpose herein described.

82,578.—CORN PLANTER.—J. N. Arvin and J. M. Whitmore, Valparaiso, Ind., assignors to themselves and A. M. Bennett, Chicago, Ill.

We claim the combination of drum, D, wire, L, cup wheels, C C, lever, F, spring, G, adjustable wire guide, I, arranged to run on journal, J, and ratchet f, constructed to operate as herein specified.

82,579.—LAMP.—James S. Atterbury and Tho. B. Atterbury, Pittsburg, Pa.

We claim a glass lamp bowl and a glass stand, united together by means of a screw socket piece, B, as a new and improved article of manufacture.

82,580.—SASH HOLDER.—Franklin Babcock, Middletown, Conn.

I claim the combination of the screw socket, A, sliding shoulder, B, with flange, C, stem, a, and spring, b, all as and for the purposes set forth.

82,581.—DOOR LATCH.—Franklin Babcock and Frederick Babcock, Middletown, Conn.

We claim the revolving flanged cam, a, when attached in the concaved ends of the case, A, which is provided with a screw thread on its exterior, all constructed to operate as specified.

82,582.—COMPOSITION FOR GENERATING GASES IN FIRE EXTINGUISHERS AND FOR OTHER PURPOSES.—J. F. Babcock, Boston, Mass.

I claim a combustible gas generating composition for use in fire extinguishing and other fluid-ejecting apparatus, when combined with a vehicle for arresting rapid combustion, substantially as described.

82,583.—CHUCK DRILL.—Q. S. Backus, Winchendon, Mass.

I claim the within described "chuck drill," constructed to operate, substantially as set forth.

82,584.—WASHING MACHINE.—James Ballard, Almond, Mich.

I claim the combination of the sliding bar, H, and its stationary rubber, F, with the swinging bar, G, and levers, L and K, and the tub, all constructed to operate as set forth.

82,585.—SCROLL SAW.—C. M. Baxter, Lebanon, N. H. Antedated Sept. 17, 1868.

I claim the combination of the short arms, E, the movable standard, F, and inclined groove, G, with the screw and crank wheel, H, being so arranged that the strain may be thrown off or on the saw by a single motion substantially as set forth.

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82,586.—TORPEDO FOR OIL WELLS.—Elias Beach, Titusville, Pa.

I claim, 1st, The perforated tube, G, arranged and operating substantially as described, for the purpose of communicating ignition of the explosive material at the lower part of the torpedo, as set forth.

2d, The primer cord, C, safety string, E, and cable, D, in combination with the primers, b, substantially as described.

3d, The supplementary cord, F, connected and operating as and for the purpose set forth.

4th, The rod, B, in combination with the primers, b, and cap, A', as set forth.

82,587.—MELALLIC CARTRIDGE —Hiram Berdan (assignor to the Berdan Fire-Arms Manufacturing Company), New York city.

I claim, 1st, Securing the re-enforce cup in the cartridge shell by means of a projection on the interior of the head of the shell, and an opening or cavity in the bottom of the cup fitting tightly on the said projection, substantially as and for the purpose herein described.

2d, The combination of the patched bullet and the brass cartridge shell, drawn from sheet metal, substantially as and for the purpose herein set forth.

82,588.—PRESERVING FRUIT AND VEGETABLES.—Jose Maria Blanco y Nuño, Havana, Cuba.

I claim the process of preserving fruits and vegetables, substantially as herein described.

82,589.—GRAIN DRYER.—David Bonnell, Oswego, N. Y.

I claim, 1st, The drying cylinder. C, supplied with heated air, in combination with the cooling screen, D3, supplied with cold air, substantially as described for the purposes set forth.

2d, And, in combination with the drying cylinder, C, and cooling screen, D3, the conveyer, supplied with cold air, as described, for the purposes set forth.

3d, And, in combination with the drying cylinder, cooling screen, and conveyer, arranged as shown and described, the furnace and fans for supplying hot and cold air, substantially as described for the purposes set forth.

82,590.—LAMP.—Benjamin S. Boydston, Richmond, Ind.

I claim a lamp, provided with a chamber, separate from the oil chamber, for carrying a supply of extinguishing fluid, or other flowing material, and which is so arranged by means of tubes or their equivalents, that when the lamp is overturned, the extinguishing material is brought in contact with the flame, for the purpose set forth.

82,591.—MACHINE FOR PUNCHING TUBES.—John T. Brigden, Hornellsville, N. Y.

I claim, 1st, The die, A, and sliding wedge, B, as constructed and arranged inside of the pipe, for holding it firmly in place while being punched, and the rod, d, and lever, C, for operating the same and removing the chips or punchings, as herein described.

2d, The hollow tube, A', for receiving the pipe, F, in combination with a slotted plug or supporting piece, placed within said pipe, and the punch, P, eccentric cam, H, lever, G, substantially as and for the purposes herein set forth.

82,592.—POTATO DIGGER.—John Burt, Sturgis, Mich.

I claim, 1st, The combination of the bar, G, semicircular plates, J', provided with adjusting holes, j, and frame, A, all arranged as described, for the purpose of regulating the depth of the shovel.

2d, The shaker, D, shovel, C, slotted arm, d, crank, f, pinion, F, gear wheel, J, and axle, E, all combined and arranged substantially in the manner and for the purpose set forth.

82,593.—BEER COOLER.—David Cammerer. Cincinnati, Ohio.

I claim the combination of the two supporting flanges, I I, perforated at i i, the elevated ridge, G, the double trough, H H', perforated at h h', and the vertically corrugated hollow webs, D1 D2, affording water communication throughout the length of the chambers, C1 C2, or nearly so, the whole being arranged as and for the purposes set forth.

82,594.—LADDER.—E. P. H. Capron, Springfield, Ohio.

I claim, 1st, A ladder, consisting of the parts, A and B, hinged together by the round, b, and having the side rails of each part notched at their ends, so as to lock upon the rounds, h and f, in the manner shown and described.

2d, Hinging the parts, A and B, by means of the round, b, secured to the edges of the side rails thereof, by means of the eyes, e, and loops, o, substantially as shown and described.

3d, In combination with the parts, A and B, hinged as described, the platform, C, provided with the slotted side bars, D, and the series of holes for adjusting the spread of the parts, A and B, substantially as described.

82,595.—WATER CLOSET.—W. S. Carr, New York city.

I claim a water-closet hopper or retainer, formed at the upper end to receive the basin, and at the lower end to connect with the soil pipe, and with a removable section, formed and located so that the swinging pan of the closet can be introduced or removed without necessarily removing the basin from said hopper, substantially as set forth.

82,596.—VALVE SEAT.—A. M. Cheeseman (assignor to himself and John Watson), Trenton, N. J.

I claim the rubber valve seat, a a, secured to its position by metallic thimble, c, substantially as shown and described.

82,597.—REFRIGERATOR.—Samuel Child, Baltimore, Md.

I claim the arrangement of the pan, C, having the waste pipe, D, with relation to the provision chamber, H, the ice chamber, A, and gutter, B, as herein described, for the purpose specified.

82,598. — FOUNTAIN PEN. — Richard H. Chinn, Washington, D C.

I claim the construction of the pen, E, points, D, collar, J, on cylinder, C, when arranged and combined as herein described, and for the purpose set forth.

82,599.—IMPLEMENT FOR LASTING BOOTS AND SHOES.—F. O. Claflin (assignor to himself and A. R. Carman), Brooklyn, N. Y.

I claim the combination of the mechanism for stretching and holding the material to be secured, or the equivalent thereof, with driving mechanism, substantially as and for the purposes described.

82,600.—TURNING WAGON HUB.—W. W. Cleaveland, Coldwater, Mich.

I claim the arrangement of the revolving cutter head, carried in the lateral and longitudinal moving frame, with the fixed arbor revolving the block of which the hub is made, all as herein described.

82,601.—FRUIT BASKET.—Nathan S. Clement, New Britain, Conn.

I claim extending the two parts which form the double bottom and sides, so as to be turned over, and form a top for the box, and so that one of the parts is detachable, the whole constructed and arranged for opening, substantially in the manner herein set forth.

82,602.—CHAIR.—D. E. Colby, Washington, D. C.

I claim the application to the cane-seat chairs of an elastic or slightly yielding rest for the cane strands, of any suitable material, and for the purposes specified and set forth.

82,603.—SASH FASTENER.—Abel Conant, Lowell, Mass.

I claim, in a sash lock, such as described, the construction and arrangement of the long and short sliding bolts, E F, with their inclined lugs or projections, g, and actuating knobs and springs, the said bolts being applied to the window jamb at the point where the sashes meet, in the manner specified, so so that the projecting lugs of such bolts shall move in planes at right angles to the plane of the movement of the sashes, and operate in connection with the upper and lower sash racks, as herein set forth.

82,604.—PAINT OIL.—Vincent Cordier, Paris, France, assignor to John Gatliff and Clement Dietrich.

I claim the paint oil herein described, composed in part of mineral oil, and in part of vegetable oil, and having the proper quantity of drying material incorporated by mixing the litharge or other drier in excess with the linseed or other equivalent vegetable oil, and afterward adding the petroleum, or equivalent tar oil, as herein specified.

82,605.—MACHINE FOR SETTING AND COOLING TIRE.—Jacob Courtleyow, Chariton, Iowa.

I claim the bench, a a a a, attached to the trough, F, together with the slide and axis, constructed, arranged and operated as above described, for the purpose of setting and cooling tire, for the purpose and in the manner set forth.

82,606.—SHAWL STRAP.—Geo. Crouch, New York city.

I claim, in combination with a rigid cross piece, A, constructed substantially as described, the handle, B, and straps, D, for the purposes indicated.

82,607.—MANUFACTURE OF AXES, HAMMERS, ETC.—F. C. Curie, Lancaster, Pa.

I claim, 1st, Converting hammers, axes, hatchets, and similar edge tools, either cast, or made from wrought or cast malleable iron, into steel, by the process substantially as herein described.

2d, Also, the new articles of manufacture, namely, hammers, axes, hatchets, and similar edge tools, made by the process, substantially as herein described.

82,608.—COAL CUTTING MACHINE.—George E. Donisthorpe, Leeds, England. Patented in England Jan. 21, 1864.

I claim, 1st, The so arranging the cutting apparatus of machines employed in getting coal and other mineral that two picks or cutters, or two sets of picks or cutters, may be caused by the engine which actuates them to act alternately, so that one pick or set of picks may make its forward stroke while the other pick or set of picks makes its backward stroke, substantially as herein described.

2d, The combination, substantially as set forth, with the guiding rail herein described, of a traveling carriage provided with clips or guards at each end to hold it to the rail, and a driving worm acting on the rail to propel the carriage, whereby one only of the rails need be laid with care.

3d, The combination, substantially as set forth, with the traveling carriage, of a guide rail, a propelling worm on the carriage acting on the rail, clips on the carriage embracing the guide rail, cutting tools mounted on the carriage, and a pressure rail for holding the carriage to its track when working, by pressing against the roof of a mine.

4th, The combination, substantially as set forth, with a carriage traveling on ways, and a locking mechanism for locking the carriage firmly while the cutters are working, of reciprocating cutters, arranged on opposite ends of an oscillating arm or lever vibrating transversely to the line of motion of the carriage, whereby a blow is made at each movement of the piston of the motor, and one cutter may deepen the groove made by the preceding one.

5th, The combination, substantially as set forth, with the cutting tools, of the clearers, l, for removing the coal loosened by the cutters.

82,609.—HEATER AND FILTER FOR BOILERS.—J. J. Doughty, Lake City, Minn.

I claim the arrangement of the horizontal shelves, with their partition pieces, the steam and water admission and discharge pipes, the lime depositing shelves, g, the filter, l, and the doors formed in the heater and filter case, A B, through which access may be had to said shelves and filter, substantially as herein shown and described.

82,610.—CHARGING SCALE.—Thaddeus Fairbanks, St. Johnsbury, Vt., and Henry Fairbanks, Hanover, N. H.

We claim, 1st, The within described arrangement of the adjustable bars, A B, etc., so that a portion of the weight of each bar shall be distributed on each side of the center of motion of the frame, M, substantially as and for the purposes herein set forth.

2d, The stops, a b, and balance poise, E, arranged relatively to each other and to the bars, A B, etc., and frame, M, substantially as and for the purpose herein specified.

3d, The friction pieces, J J, arranged as represented, and adapted induce a constant friction against the bars, A B, etc., substantially as and for the purposes herein specified.

4th, The adjustable bars, A B, etc., beam of frame, M m, steps, a b, etc., and pinching screws, O P, etc., when provided with the bearing pieces, o, held loosely between the shoulders, l and 2, and adapted to receive the force of the screw in confining the stops firmly, as herein specified.

82,611.—WAGON BRAKE.—Chas. M. Flint, Hancock, N. H.

I claim the arrangement of the brake arm, c, and the slotted plate, g, with the king bolt, the front axle, and the front bar of the perch, the whole being substantially as specified.

82,612.—VISE.—Orlando V. Flora, Madison, Ind.

I claim the comonation of the post, G, and bars, B C, with the locking bar J, constructed and operating in connection with the movable jaw, D, substantially as and for the purposes herein specified.

82,613.—MACHINE FOR DRESSING BARREL HOOPS.—James T. Forsyth, Wheeling, W. Va.

I claim, 1st, The circular revolving bed. B, the catch, D, and the spring, F, or their equivalents, substantially as described.

2d, The concentric arc, A, in combination with the knives, H H and K K, substantially as described and for the purpose set forth.

82,614.—STEERING APPARATUS FOR SECTIONAL BOATS.—William Frick, Middletown, Pa.

I claim, 1st, The hinged coupling bar, B B1, when fastened permanently to one boat, and attached to the other by standards, C C, in such manner as to permit a free vertical, longitudinal, and lateral oscillation, but to confine, at the same time, the boats to their relative alignment fore and aft, substantially as set forth.

2d, The combination of said hinged coupling bar, standards, and cross heads, C C, connected by springs, B4, arranged to operate substantially as and for the purpose set forth.

3d, The combination of the wheel, the tiller rope, and the hinged bar connecting the two boats, when arranged to operate substantially as set forth.

82,615.—KITCHEN IMPLEMENT.—John Frisch, Albany, N. Y.

I claim the shovel, A, furnished with a stove lifter at its rear end and having its handle, C, pivoted, as and for the purpose set forth.

82,616.—WRITING TABLE AND CHAIR.—Peter Geiser, Waynesboro, Pa.

I claim, 1st, The combination of the chair, A, socket, C, leg, B, arms, D, and table, F F, substantially as shown and described.

2d, The construction of the table as composed of the parts, E F, substantially as shown and described.

3d, The paper and book holder, as constructed, consisting of parts, G H H I e and c', and their equivalents, substantially as shown and described.

4th, The combination of the paper and book holder with the cover of the table, substantially in the manner shown and described.

5th, The arrangement of the locking device, K, catch, a, and stops, h, substantially as and for purpose described.

82,617.—HORSE POWER.—Peter Geiser, Waynesboro, Pa.

I claim, 1st, The combination and arrangement of the frame, A, and journal box, E, substantially as and for the purpose described.

2d, The combination and arrangement of the vertical shaft, F, and the journal box, E, substantially as and for the purpose described.

3d, In combination with the above the combination of the ratchet coupling and the shaft, G, substantially as and for the purpose described.

4th, The construction of the frame, A, and the arrangement, with reference thereto, of the journal box, E, shaft, F, gear wheels, B and C, and pins or guards, b b.

5th, The arrangement of the oil passages, e a f and h, substantially as and for the purpose set forth.

82,618.—REAMER AND TAP.—Samuel Glasson, New York city.

I claim the arrangement, herein described and shown, of the tubular stock A, grooved plug, C, cutters, B, springs, s, and swiveled screw, E e, for the purpose set forth.

82,619.—PYROTECHNIC SIGNAL.—H. J. Harris, Shreveport, La

I claim the trail match or fuse, constructed substantially as described, that is to say, consisting of the slow match or fuse, provided with a series of signal or cannonading balls, pyrotechnic meteors and streamers, or other equivalent devices connected with the slow match by short branch quick matches or fuses, and adapted to be used in connection with the balloon or other equivalent means for elevating and sustaining the same in the air while firing the same, substantially as described.

82,620.—TOOL FOR GAS FITTER.—Jacob Himmer, Hartford, Conn.

I claim an improved combination tool, constructed and arranged substantially as described.

82,621.—HAMMER.—George W. Hubbard, Lowville, N. Y.

I claim the application, to nail hammers, of a nail clamp attachment using for that purpose the chamber, C, the clamp, E, the spring, G, the lugs, l, and screw, F, constructed to operate substantially as herein described.

82,622.—SODA FOUNTAIN.—John C. Kennedy, Chicago, Ill.

I claim, 1st, The pump, B, the three-way cock, D, pipes, C and V, reservoir A, and air pit, F, all arranged and operated substantially as described.

2d, Fountain, A, provided with an air pit and gage tube, as described, pump, B, globe check valve, E, three-way cock, D, and fountain, H, the whole being arranged, constructed, and operated in the manner and for the purpose specified.

82,623.—REVOLVING HARROW.—Baxter Lyon, Mount Pleasant, Ill., assignor to himself and Dana L. Cohembia.

I claim a revolving harrow, the front and rear portions of which, being constructed substantially as described, are connected to each other by a jointed or flexible connection, as and for the purpose described.

82,624.—CLOTHES PIN.—Levi Matthews, Antrim, Ohio.

I claim the double self-adjusting clothes pin, H, constructed as described, and provided with a ring, I, substantially as and for the purposes herein set forth.

82,625.—LET-OFF MECHANISM FOR LOOM.—Patrick McGee, North Providence, R. I.

I claim the combination, with the pad, E, and yarn beam, B, of the toe, a', spring bar, c', lever, d', abutment, R, and pusher bar, l, receiving motion from the sword or any other portion of the loom, and acting through the abutment, R, on the let-off motion, in such manner that the letting off of the warp will be regulated according to the variable diameter of the beam, substantially as herein specified.

82,626.—PUG MILL.—J. C. McKenzie, Adrian, Mich.

I claim, 1st, The chamber or reservoir, F, arranged and employed, in connection with the chamber, E, substantially as described, for the purpose specified.

2d, The pug mill, constructed as described, with the chambers, E F, doors, I, and aperture, e, the horizontal angular rods, O, pug shaft, K, and blades, M M1 M2, all arranged to operate substantially in the manner set forth.

82,627.—ENGRAVERS' VISE.—George N. Munger (assignor to himself and Stillman Moore), New Haven, Conn.

I claim the engravers' vise herein described, consisting of the two jaws, D and E, arranged upon the threaded plate, B, and in the plate, C, so as to be adjusted to grasp the article of regular or irregular form, substantially as herein set forth.

82,628.—BEE-HIVE.—Benjamin F. Nave, Fort Wayne, Ind.

I claim the frame, A, constructed as described, and secured together by means of the rod, x, and nut, x', as shown and described for the purpose set forth.

82,629.—ATMOSPHERIC KNOB.—Orwell H. Needham, New York city.

I claim an atmospheric handle, composed of a flexible face or sucker portion, A, and flexible or elastic knob or knob part, B, having a cavity, b, within it in communication, by a passage, c, with the interior face of the sucker portion or space contained therein, substantially as specified.

82,630.—HUB FOR WAGON WHEEL.—Freeman Nichols, Newport, Ky.

I claim the arrangement described, consisting of the wooden core, with mortises, B, and affording seats on its periphery for the shoulders, G, of the spokes, together with band, D, having mortises, e e', the latter or outer portions being more flaring than the inner, and adapted to form sockets for the taper portions of the spokes, substantially as described and represented.

82,631.—HORSE RAKE.—Hezekiah B. Noble, South Windsor, Conn.

I claim crank, m, plate n, head h, (teeth v, which constitute the rake head,) in combination with the bars f f, rack, u, pawl, e, (for elevating or depressing the rake head), arms, k, lever, p, and holder, q, all arranged and operating substantially as and for the purpose described.

82,632.—CHIMNEY COWL.—Eugene Theodore Noualhier Paris, France.

I claim the tapering concentric pipes or cases, B and C, arranged as represented, relatively to the flue, A, and adapted to receive the wind and deflect it upward, as represented, the space between B and C, being divided in combined with a revolving hood, substantially as for the purposes herein set forth.

82,633.—REFINING LIQUOR.—John S. Oliver, New York city, assignor to John W. Cox and Alexander D. Shaw, same place.

I claim, 1st, The process of separating from spirituous, hydrocarbon, and other liquids, the free or non-condensed gases contained therein, by beating up or separating the liquid into fine particles or spray while in vacuo, by the action thereon of mechanism suitable for the purpose, substantially as herein specified.

2d, The drums, C D, arranged within a vacuum chamber, A, and operating in substantially the manner and for the purposes herein specified.

3d, The combination, with the drums, C D, of the worm, F, arranged within the box, A, substantially as and for the purposes herein specified.

4th, The combination, with the chamber, A, containing the drums, C D, and worm, H, of an air pump arranged to operate substantially as and for the purpose herein specified.

5th, The arrangement of the perforated plates, a b c d, in the box, A, substantially as herein shown and described.

82,634.—BEE HIVE.—J. N. Outten, Caseyville, Ky.

I claim the steps, F F, when arranged and used in combination with the chambers, E E, and honey boxes, of a bee hive, substantially as and for the purposes herein set forth.

82,635.—MANUFACTURE OF SOAP.—Henry A. Pease, Hartford, Conn., assignor to himself and Jeremy W. Bliss, same place.

I claim a soap compound, of the ingredients, in a greater or less proportion, as required, substantially as described.

82,636.—PORTABLE ADJUSTABLE ELASTIC SEAT.—Howard Perkins, Mansfield, assignor to himself and Benjamin S. Leonard, Sharon, Mass.

I claim the construction of the elastic supplementary seat, with its hinges, C, shields, D, and elastic feet, E, combined as herein described, and for the purposes set forth.

82,637.—COAL STOVE.—Albert J. Redway, Cincinnati, Ohio.

I claim the central crown plate, D, having perforated bars, d d, by which it is adjusted relatively to the annular cowl, C, substantially as shown and described.

82,638.—COOKING STOVE.—Albert J. Redway, Cincinnati, Ohio.

I claim, 1st, The removable oven, supported and sliding on transverse angle pieces, and over a flange, on one stove plate, and with a marginal flange fitting into a rebate on the other stove plate, so as to make a joint with the plates at the respective ends of the said oven, substantially as described.

2d, The four sided oven, H, and flue plate, D, so constructed and arranged as to form a non-reverting and continuous flue around the oven, and to be removable to expose the flue plates for cleansing, substantially as described.

82,639.—SELF-ADJUSTING TELEGRAPHIC RELAY.—Lewis H. Reynolds, Goshen, N. Y.

I claim the double electro-magnet, or two electro-magnets, placed in a helix or helices, with their like poles near each other, and attachment to armature or armature bar of common relay, so that their repulsion will counteract or nearly counteract the attraction of armature of common relay to its own magnet.

82,640.—ENDLESS BELT.—Henry Richards and Justus A. Traut, New Britain, Conn.

We claim, as a new article of manufacture, an endless belt, constructed substantially as described.

82,641.—HAY KNIFE.—John L. Ripley, Fremont, Ohio.

I claim, as a new article of manufacture, a hand hay knife, composed of the pointed blade, A, with serrations, x x, on its edge, and connected to the handle, B C, all as herein shown and described.

82,642.—METHOD OF CASTING METALS.—Jacques Rives, Paris, France.

I claim the mold, L, arranged within a vessel, A, having a detachable top, B, and between which and the mold is a body of charcoal, substantially as and for the purpose described.

82,643.—CLASP RING.—Leverett A. Sanford, Wolcott, assignor to himself and Albert Warner, Bristol, Conn.

I claim a clasp ring, made in one piece of metal, and secured by one screw, as an improved article of manufacture, substantially as described.

82,644.—SNAP HOOK.—Leverett A. Sanford, Wolcott, assignor to himself and Albert Warner, Bristol, Conn.

I claim the combination of the hook, a, socket, c, springs, d, pad, k, constructed and arranged substantially as and for the purpose described.

82,645.—RAILWAY RAIL JOINT.—James S. Schoonover, Corry, Pa.

I claim the jaws, B B', provided with the pins or ribs on their inner surface, engaging with the corresponding notches on the bases or flanges of the rails, as shown in Fig. 4, and with the recess, d, for preventing the end play of the clamp, C, in combination with the split wedge, E, and the clamp, C, all constructed and arranged substantially as set forth.

82,646.—CULTIVATOR.—George Seibert and John Seibert, Ashley, Ill.

We claim, 1st, The combination of the frame, the wheels, and two independent axles, F F', with the levers, G, ratchet plates, G', and pawls, H, substantially as and for the purpose set forth.

2d, The combination of the driver's seat, K, braces, I, and interior beams, C" C", so arranged that the latter may be moved laterally by the action of the driver, substantially in the manner set forth.

3d, The combination of the parts last aforesaid with the lever, L, crank, M, and connecting rods, N, substantially as set forth.

4th, The combination of the frame, B, the oscillating beams, C" C", and friction rollers, O, arranged to operate substantially as described.

5th, The combination of the connecting rods, N N, the oscillating beams, C" C", and the eye bolts, N', for regulating the relative position of the plows, substantially as described.

6th, The arrangement of the tongue, A, brace rod, A1, and stud screw, A2, substantially as and for the purpose set forth.

82,647.—RUBBER MAT.—Frederick M. Shepard, N. Y. city.

I claim the combination of a cellular rubber web, substantially as described, with a detachable plate or receptacle, whether the same be flanged or not.

82,648.—Gate.—John A. Smith, Lacon, Ill.

I claim a gate, having side posts, B, cross bar, C, stanles, O and c c, spring S, post, E, and pivot, D, constructed, arranged, and operating substantially as herein specified.

82,649.—SAWING AND BORING MACHINE.—Thomas Smith, California, Mo.

I claim, 1st, The pivoted carriage table, U, provided with two curved slots, s s, and operating in combination with two concavo-convex saws, substantially as and for the purpose described.

2d, In combination with the above, the inclined and adjustable table, T, pivoted at e, and operating substantially in the manner and for the purposes specified.

3d, The adjustable, attachable, and detachable support, A', for the driving shaft and wheel, when provided with the swinging leg, A", and so pivoted to the frame, A, of the machine, that its outer end can be elevated or depressed at pleasure, substantially as and for the purpose specified.

82,650.—TUMBLER WASHER.—Daniel M. Somers, N. Y. city.

I claim, 1st, A tumbler holder, consisting of a tubular stem, F, with fixed pendent arms, G, and a jointed arm, G', connected with and operating the valve, H, in an automatic manner, substantially as described.

2d, The arrangement of a turbine within the supply stem, and relatively to the discharge orifices of the outside washer, to give a rotary motion to the latter, substantially as shown and described for the purpose set forth.

3d, The combination of the vase, d, forming a valve, I, with a rotary tumbler sprinkler, substantially as set forth.

82,651.—APPARATUS FOR COOLING AND FILTERING LIQUIDS. —Daniel E. Somes, Washington, D.C.

I claim, 1st, The supply pipe, B, two-way cock, d, and delivery pipes, F B', with the cooler, D, placed in the ground beneath a hydrant or tap, as set forth.

2d, The combination of the supply pipe, B, cooler, D, delivery pipe, B', and filter, H, substantially as described.

3d, The supply pipe, B, two-way cock, d, cooler, D, and ice box, G, substantially as described.

4th, A cooler, tapering towards and pointed at its lower end, as arranged in relation to supply and discharge pipes, substantially as herein shown and described.

82,652.—CHURN.—Edward Spain, Philadelphia, Pa.

I claim, 1st, A dasher, having inclined perforated vanes, arranged at an angle with respect to each other and to the axle of the dasher, as set forth for the purpose specified.

2d, So perforating the vanes of the dasher that the jets of cream which pass through the said perforations shall be caused to cross each other, as described, for the purpose specified.

82,653.—RAIN WATER CUT-OFF.—John Spear, Carbondale, Ill.

I claim a conduit for water, having pipes, A and B, box, C, elbow, D, partition, E and indicator, G, constructed, arranged, and operating, substantially as specified.

82,654.—FRUIT DRYER.—John Spear, Carbondale, Ill.

I claim a fruit dryer, having sections, A and D, shaft, C, drum, G, flanches, K, shelves, H and d, dampers, c and L, doors, S and M, and hook and pin, Y, constructed and arranged substantially as herein specified.

82,655.—AUXILIARY POWER FOR SEWING-MACHINE.—Greenleaf Stackpole, New York city.

I claim the application to the sewing-machine of an auxiliary power, when used in conjunction with and controlled by the treadle worked in the ordinary manner, to assist the operator, substantially as and for the purpose set forth.

82,656.—WASH BOILER.—O. F. Stedman, Westfield, N. Y. Antedated June 2, 1868.

I claim the concave plate, D, in combination with the tube or tubes, E, and perforated bottom, C, constructed and operating substantially as and for the purposes herein set forth.

82,657.—CLOTHES DRYER.—Henry D. Struss, Brooklyn, N.Y.

I claim the combination of the stretchers, C, having guides, c, at each end, and carrying the clothes line, a, with the corner posts, A, pulleys, p q r, and cords, g, all arranged for operation, substantially as shown and described, for the purpose set forth.

82,658.—COMPOUND SAFE DOOR HINGE.—P. J. Stuhltrager, Philadelphia, Pa.

I claim a compound hinge, constructed and applied substantially as and for the purpose herein described.

82,659.—PUMP.—Claude Ludovic Tavendon, Paris, and Jules Moret, Sèvres, France.

We claim the within-described construction and arrangement of the piston, composed of two valved heads, connected together by a tubular rod or sheath, adapted for the passage of the liquid, as specified, working in a chamber divided into two compartments, S S', by a disk or partition, U, all as and for the purposes herein set forth.

82,660.—COMPOSITION FOR DRESSING HAIR.—Jeremiah C. Tilton, Sanbornton Bridge, N. H.

I claim the composition of matter, made of the within named ingredients, in or about the proportion set forth.

82,661.—POLISHING THREAD.—Wm. W. Trapp (assignor to Tobias Kohn), Hartford, Conn.

I claim, 1st, The combination of two rubber carriages, acting in opposite directions on any one or more threads, substantially as described, with one or more flyers and reels, as and for the purpose described.

2d, The devices, a', c', z, or their equivalents, for stopping and starting the pair of rubber carriages, working in opposite directions upon one thread, so that they are stopped and started at the end of the throw of the crank, substantially as described.

3d, The machine, constructed and arranged substantially as described, having sets or series of ruboer carriages on opposite sides of the driving shaft which move up and down together, those on the same side having a motion in opposite directions, thereby balancing the reciprocating motions of the several parts, and causing the least possible jar in the machine.

4th, The two rubber carriages, acting together upon one or more threads, and having a reciprocating motion in opposite directions, to divide and balance the strain upon the thread, substantially as described.

82,662.—BOOT AND SHOE HEEL.—J. W. Tull and Geo. Stevenson, Zionsville, Ind.

We claim the employment of an india-rubber heel for boots or shoes, when used in combination with a letter or metal plate, the said heel and plate being secured together substantially in the manner herein described.

82,663.—METHOD OF CONSTRUCTING COLUMNS, ETC.—George Walters and Thos. Shaffer, Phoenixville, Pa.

We claim, 1st, In the construction of metallic columns and shafts, confining wrought iron or steel plates between external cramping bars or washers, b b, and internal metallic disks, d d, by rivets, upon or around which said disks have been cast, or which are attached thereto, and headed down upon the plate while hot, so that the same, in shrinking, shall closely draw the plate to the disk, in the manner substantially as described.

2d, In combination with the shaft, constructed in the manner set forth, the pointed tip, f, for the purpose set forth.

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82,664.—Method of Constructing Columns, etc.—George Walters and Thomas Shaffer, Phoenixville, Pa.

We claim the manner of constructing columns or shafts of wrought iron or steel plates, curved or bent on the line of their width, and attached by bolts or rivets to internal rings or disks, so shaped, in relation to said plates, that a space shall be left between them, in order that the plates may be drawn down, and their edges brought into close contact by the compression of said rivets or bolts, substantially as set forth.

82,665.—Journal Box.—Geo L. Weaver, Hartford, Conn.

I claim the combination of the journal box, having annular grooves in the heads, C and D, and corresponding grooves on both ends of the shaft bearings, B, with balls of two different sizes, placed alternately in the annular grooves, the whole arranged and operating as and for the purpose set forth.

82,666.—Pantaloons Stretching Device.—S. C. Wells, Le Roy, N. Y.

I claim the combination of bars, A A, weights, b b, springs, a a, and clamping device, c, substantially as and for the purpose described.

82,667.—Lubricator.—J. B. Wickersham, Philadelphia, Pa.

I claim, 1st, The sleeve, f, formed with a swell upon one side for the introduction of a feeder, in combination with the tube, e, and reservoir, a, for the purposes and as specified.

2d, A lubricator formed with the tube, e, of white metal, for the purposes and as specified.

3d, The combination of the glass reservoir, a, and screw neck at its lower end, with the cup, c, and washer, d, rendered permanently tight by cement, as set forth.

4th, A capillary feeder formed by metal wires or rods, or a tubular strip of metal enclosed in a fibrous covering, so as to form a siphon, as and for the purposes set forth.

5th, The cock, b, and chamber, k, in combination with a capillary feeder and oil cup, substantially as set forth.

82,668.—Farm Gate.—Thos. B. Wickham, Granville, Ohio.

I claim a farm gate, having posts, A, B and C, brace, a, clutch, c, trundles, b and n, gate, E, arm, g, and guide slat, D, constructed, arranged, and operating substantially as specified.

82,669.—Measuring Hights and Distances.—Chas. Wilson, Clinton, Pa.

I claim, 1st, The circular cross lined plates, A and P, with their curved upright bars, G and U, combined and operated as herein described, and for the purposes set forth.

2d, The pivot bars, V, with their adjustable round and square plates, with regulating screws, C and X, constructed and operated as herein described, and for the purposes set forth.

3d, The adjustable target, N, combined and operated with the telescope, Q, as herein described, and for the purposes set forth.

82,670.—Pump.—Chas. A. Wilson, and Wm. R. Dunlap, Cincinnati, Ohio.

We claim, 1st, The combination of the annular valve seats, a b c d, and annular valves, E, when arranged in a vertical series, one above another, and constructed as herein described, so as to act simultaneously around the entire circumference.

2d, In combination with the sections, A B C D, with their described flexible flaps, the annular stops or flanges, G G'.

3d, The protuberances, F, on the under side of the sections, B C D, for the purpose explained.

82,671.—Starting Apparatus for Railroad Cars.—Erastus Woodward and Jos. S. Millert, Charlestown, Mass.

We claim the horizontal bar, B, levers, A and C, and anti-friction roller, R, combined with the other described parts, all constructed, arranged, and operating in the manner and for the purpose set forth.

82,672.—Draft Valve in Railroad Car Stoves.—John E. Wootten, Reading, Pa.

I claim a deflector, so combined with the air heating space of a railroad car or stove heater, and with the delivery pipes or orifices connected therewith, that when the car is in motion the said deflector can be made to control the temperature of the car, substantially in the manner described.

REISSUES.

41,419.—Machine for Grinding Saws.—Dated February 2, 1864; antedated January 22, 1864; reissue 3,138.—John G. Baker, Philadelphia, Pa.

I claim, 1st, The combination, with a grindstone or grindstones, of feed rollers, J, the axes of which are parallel, or nearly so, with those of the stones.

2d, Two grindstones, arranged at an angle in respect to each other, and having traversing motion imparted to them, all substantially as and for the purpose herein set forth.

3d, The combination of the expansion cranks, G, with the slotted traverse bar, F.

4th, The combination of the feed roller with the frame, I.

5th, The frame, I, made in two halves, and carrying the feed rollers, J, in combination with the springs, g, or their equivalents.

59,388.—Medical Vacuum Chamber.—Dated November 6, 1868; reissue 3,139.—Geo. Hadfield, Cincinnati, Ohio.

I claim the employment of hand support or rest, substantially as and for the purpose set forth.

Also the sealing cap, F substantially as and for the purposes set forth.

31,599.—Vulcanizing Vessel.—Dated March 5, 1861; reissue 3,140.—Geo. E. Hayes, Buffalo, N. Y.

I claim, 1st, A vulcanizing vessel or oven, having its opening and closing joint, for insertion and removal of the mold, at or near the bottom, by making it of two sections, the upper or enclosing one of which forms the body of the vessel, while its lower section constitutes a base thereto, substantially as specified.

2d, So constructing a vulcanizing vessel, with a flattened bottom, as that the plaster mold, containing the rubber compound, shall be in contact with the inside of the lower part of the vessel, so that the heat from the lamp or other heater shall be applied directly to that part of the vessel upon which the mold lies, substantially as and for the purposes set forth.

3d, A mercury chamber, formed in the upper section of the vulcanizing vessel, the same being constructed and arranged with the thermometer, essentially as described.

4th, The opening ring, C, in combination with the bottom, A, band, D, and cover, E, substantially as specified.

58,940.—Portable Book Clamp.—Dated October 16, 1866; reissue 3,141.—Albert J. Manchester (assignee of Thos. Goodrum), Providence, R. I.

I claim, 1st, A portable book package binder, having the following elements in combination: The clamps, A A, a tightening cord, e, and windlass, C, provided with a ratchet plate and pawl, or equivalent holding device, substantially as described.

2d, The compound handle, B, and windless barrel, C, in combination with the top binding strips, A, substantially as described.

47,812.—Drill Bit.—Dated May 23, 1865; reissue 3,142.—Horace T. Love, New York city, assignee of Wm. W. Grier and Robert H. Boyd.

I claim a rotating drill or drill bit, whose edges, of diamonds or other hard cutting points, are separated at its forward end by a recess or notch, and are arranged with relation to the axial line of the tool and each other, substantially in the manner and for the purpose described.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

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2,663.—Smoke Consuming Apparatus.—Dillwyn Smith, Burlington, N. J. Aug. 27, 1868.

2,691.—Relieving Coupling for Wire Rigging.—W. H. Shock, Washington, D. C. Aug. 31, 1968.

2,759.—Compositions for the Production of Artificial Stones, Tiles, and Pipes, and Useful also as Cements, Paints, and for Stuccoes.—Geo. A. Frear, Chicago, Ill. Sept. 7, 1868.

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SILICATE OF SODA AND POTASH, for Sweetening hard water in cisterns and wells; also for protecting wood and making cements water and fire-proof. For sale by the sole manufacturers, L. & J. W. FEUCHTWANGER, 16 4 55 Cedar st., New York.

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Woodworking Machinery generally, Manufactured cor Fifteenth and Penn Avenue, Phila. POWER & DAVIS 4 13

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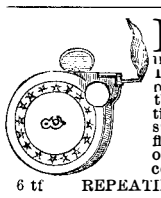

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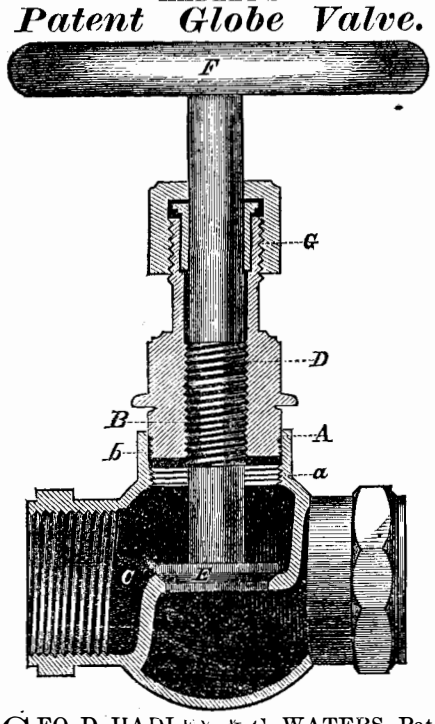

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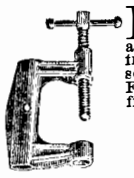

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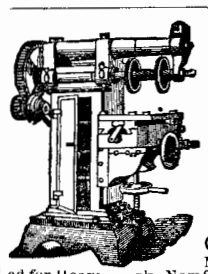

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U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept 24, 1868.

P. W. Mackenzie, of Orangeville, N. Y., having petitioned for an extension of the patent granted him on the 2d day of January, 1855 for an improvement in "Machine for Blowing Blasts" etc., it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 26, 1868.

Allen B. Wilson, of Waterbury, Conn., having petitioned for an extension of the patent granted to him on the 19th day of December, 1854, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 7th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept 25th, 1868.

Jesse W. Hatch and Henry Churchill, of Rochester, N. Y., having petitioned for an extension of the patent granted to them on the 2d day of January, 1855, and reissued on the 24th day of July, 1866, for an improvement in "Machines for Cutting Boot and Shoe Soles," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON. D. C., Sept. 12, 1868

Martin P. M. Cassity, of Granada, Kansas, having petitioned for an extension of the patent granted to him on the 19th day of January, 1855, for an improvement in "Making Nuts," it is ordered that said petition be heard at this office on the 7th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 30, 1868.

Arnton Smith, of Girard, Ill., having petitioned for an extension of the patent granted him on the 16th day of Jan. 1855, for an improvement in "Plows," it is ordered that said petition be heard at this office on the 21st day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed at this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 21, 1868.

Hannah M. Brown, of Woonsocket, R. I., administratrix of the estate of John E Brown, deceased, and W E. Barrett, of Providence. R. I., executor of the estate of Stephen S Bartlett, deceased, having petitioned for the extension of a patent granted to the said John E. Brown and Stephen S. Bartlett, on the 2d day of Jan., 1855; reissued Jan. 1st, 1861, and again reissued Feb. 25, 1862, in three divisions, numbered respectively 1281, 1282, and 1283, for an improvement in "Grain and Grass Harvesters," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
16 3 S. H HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 18, 1868.

Thomas Slaight, of Newark, N. J., having petitioned for an extension of the patent granted him on the 2d day of January, 1868, for an improvement in "Padlocks," it is ordered that the said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
15 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 9, 1868.

Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for an extension of the patent granted to him on the 24th day of June, 1851, for an improvement in "Machinery for Cutting Rattan," etc., (this application having been authorized by act of Congress, March 2, 1867), it is ordered that the said petition be heard at this office on the 21th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
15 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 21, 1868.

Joseph S. Winsor, of Providence. R. I., having petitioned for the extension of the patent granted him on the 2d day of January, 1855, for an improvement in "Machines for making Weavers' Harness," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
15 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 23, 1868.

Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for the extension of a patent granted him the 2d day of January, 1855, for an improvement in "Machine for Splitting Rattans into Strips," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
15 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 11, 1868.

Jarvis Case, of Lafayette, Ind., having petitioned for an extension of the patent granted him on the 16th day of January, 1855, reissued on the 16th day of November, 1858, and again reissued on the 17th day of April, 1866, for an improvement in "Seed Planters," it is ordered that said petition be heard at this office on the 21st day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
14 3 ELISHA FOOTE, Commissioner of Patents.

U. S PATENT OFFICE,
WASHINGTON, D. C., Sept. 11, 1868.

George W. Hubbard and William E Conant, of New York city, having petitioned for an extension of the patent granted them on the 9th day of January, 1855, and reissued on the 18th day of September, 1866, for an improvement in "Operating Slide Valves in Direct Action Engines," it is ordered that said petition be heard at this office on the 21st day of December, next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
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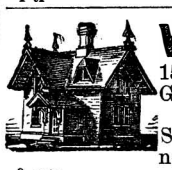

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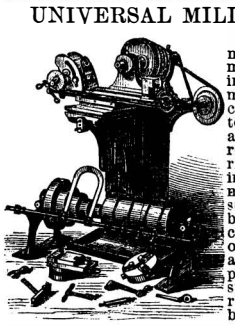

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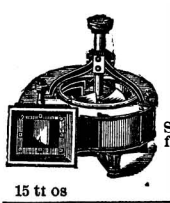

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